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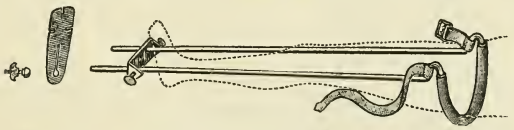

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ORIGINAL ARTICLES

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THE FUNCTION OF MEDICAL AND SURGICAL CONSULTING STAFFS DETERMINED BY THE EXPERIENCE OF THE LATE WAR

THE WELLCOME FIRST PRIZE ESSAY, 1919

BY COLONEL JAMES L. BEVANS,
Medical Corps, U. S. Army

(With five illustrations)

THE armistice cut short the evolution of a complete plan for applying the activities of the consulting staffs in the rapidly expanding army. The difficulty encountered in effectively utilizing the immense resources of the medical profession in a time of military crisis was a part of our national unpreparedness. The roots of the trouble go deep into military and medical organization.

The problem is to so list and classify the medical personnel of the nation that its resources may be known; to arrange in peace time for the mobilization for war of such part as may have military value; to so mould this civilian mass as to give it a place in the army machine. Definite changes in the Medical Department, to be included in the Tables of Organization, and to be accurately outlined in Regulations and the Manual for the Medical Department, are necessary. Some form of coördination to bring the Medical Department and the profession at large into permanent contact is indicated. It is timely, therefore, to make a considered study of the experience of the World War in order to afford the future a solution of the problem.

If one turns to a pre-war Manual for the Medical Department, he will find in the paragraphs devoted to general hospitals about the first indication of a formulated division of the functions of medical officers into those pertaining to administrative duties and those having to do with the purely professional. A Professional Division, with Chiefs of Medical and Surgical Services, was established by these regulations for general hospitals. For a very long time, medical officers have been given assignments in accordance with their qualifications, but specialism

has not been recognized either in the Tables of Organization or in the Regulations. The subjects for promotion examinations were changed about ten years ago in such a way as to indicate that a plan was on foot to permit medical officers to choose a career along either professional or administrative lines, but in general the tendency has been to give medical officers administrative assignments as they advanced in rank, and not to develop them in medical specialties.

Before the war professional matters were handled in the Surgeon General's Office by the Division of Sanitation. A separate division for purely professional service was not included in the organization. It is interesting to follow the development of the professional divisions as the office expanded with the war.

On May 24, 1917, a Division of Field Sanitation was established, with sections of inspection, communicable disease, sanitary engineering, current vital statistics and personnel.

The Hospital Division was created in July, 1917. In carrying out the program for the care of sick and wounded both in the United States and abroad the division issued a set of regulations governing the internal administration of base hospitals and recognized the professional branch by providing for three sections, surgical, medical and laboratory, with a chief for each, and further by including under the sections a number of special sections. In the surgical section, there were subsections for general surgery, including that of the chest and abdomen, and fractures; for surgery of the head, to include the brain, eye, ear, nose and throat, and plastic work on the face and mouth; for orthopedic surgery; for urology; for roentgenology. The medical section embraced general medicine, neurology and psychiatry. The laboratory section comprised pathology, bacteriology, serology, chemistry, postmortem and public health work.

The Division of Laboratories and Infectious Diseases was organized in the Surgeon General's Office in June, 1917. Its first section concerned laboratories and infectious diseases, exclusive of venereal diseases; the second section was for combating venereal disease; urology and dermatology occupied the third. This division did a great deal of work which brought the Army into association with civilian organizations, both lay and medical.

The Division of Internal Medicine came into existence early as a result of the necessity for the reëxamination of the Army for tuberculosis; the cardio-vascular section was added. The division had an important duty in selecting chiefs of medical service for base and other hospitals and generally in mobilizing and classifying the medical personnel of the country.

When the Division of General Surgery was established it also engaged in the classification of members of the Medical Reserve Corps as to their qualifications in surgery. It provided schools for surgeons and studied the question of the standardization of surgery and of equipment. Hospital staffs were inspected; surgical teams were organized; there were investigations and consultations with reference to special surgical problems.

The orthopedic surgeons were early in the field. Their two national societies had been interested in war problems in 1916; committees were appointed by each society and a joint chairman was named. In May, 1917, the chairman was commissioned and went abroad. In July, 1917, an advisory council for orthopedics

was placed in the Surgeon General's Office, and from this the Division of Orthopedic Surgery developed.

The Division of Surgery of the Head included the sub-section of ophthalmology, which was organized early, and otolaryngology, which continued the work already started by the sub-committee on otolaryngology of the Council of National Defense. The section of brain surgery followed in July, 1917.

A Division in Neuro-Psychiatry was established, and in August, 1917, a Division of Psychology was split off from it.

The Medical Division of the Air Service was organized September 6, 1917.

These divisions were apparently not organized in accordance with a definite program, certainly not because they were included in the Tables of Organization, but because of an imperative necessity for their establishment. At once each important branch found itself faced with the problem of obtaining adequate personnel and began to comb official and unofficial lists for the names of qualified men, and to classify them. In reviewing the activities of the various divisions it will be found that if they did not originate in the Council of National Defense and possess at the beginning close contact with the profession at large, they at once sought to bring themselves into effective liaison with non-military organizations and persons of similar interests; thus the Surgeon General was given the advantage of constant and intimate touch with the medical profession in civil life, and, of even more importance, the members of the profession at large were given promptly an accurate estimate of the medical thought and needs of the army. It is necessary to emphasize the fact that a definite program was not in evidence; there was no officer or unit for the close coördination of the various professional divisions. Even a skeleton program and organization would have prevented much overlapping of activities; mistaken zeal exerted in behalf of certain specialties would have been controlled; the different branches would have found themselves in their proper relative positions of importance and the new divisions in forms not far different from those to which the army was accustomed.

In France, the office of the Chief Surgeon, American Expeditionary Force, was organized with five divisions: Hospitalization, Evacuation and Hospital Administration, Sanitation, Sanitary Inspection and Medical Statistics, Personnel, Medical Supplies, Finance and Accounting. No separated division was established for the professional services, although the director, after he was named, came under the Division of Hospitalization, Evacuation and Hospital Administration.

The Chief Surgeon outlined the plan of organization for the professional services in Circular No. 2, dated November 9, 1917. (See Appendix I.) The divisions established were about the same as those in the office of the Surgeon General. Each division had a director in the United States and one in France. The divisions

were eight in number, covering general medicine, general surgery, orthopedic surgery, surgery of the head, urology, including venereal, skin and genito-urinary diseases, laboratories, psychiatry and roentgénology. Assistant directors and consultants for corps, sections of the lines of communication, larger hospital centers and other areas were mentioned as future officers. It was emphasized that professional authority did not include administrative control. Directors were held to be immediately responsible to the Chief Surgeon for the work performed in their divisions and were to "direct and coördinate the professional service of all sanitary formations and hospitals" to provide for "continuity of treatment along the lines of recognized, approved practice, from the front to the rear." Finally, the professional service of base, general and other hospitals was to be organized, so far as practicable, into eight sections corresponding to the divisions and suitable officers assigned to the sections by commanding officers of the hospitals. Professional qualifications were to be considered in making these assignments and the head of each section was to be responsible to his commanding officer for the particular section concerned.

A critical reading of this circular, which was basic, reveals certain weaknesses which must be considered, if experience gained during the war is to be made of value. There were already divisions fighting at the front and divisions in the office of the Chief Surgeon. The addition to the nomenclature of professional divisions added to the confusion. All of the specialties were coördinate, orthopedic surgery, for instance, not being subordinate to general surgery. The title given to Directors of Divisions seemed to imply administrative control which was interdicted. To direct and control the professional service of all sanitary formations, to establish continuity of treatment from front to rear, to change professional procedure and inaugurate new methods, were some of the duties placed upon the directors; is it cause for wonder that professional and administrative control were sometimes confused? The only coördinating element in the plan rested with the Chief Surgeon, already overwhelmed with the responsibilities devolving upon him.

It is necessary to visualize the situation of the directors of the new services as they were assigned to duty, in the fall of 1917, to comprehend the difficulties of their task. They were congregated at Neufchateau, 45 miles from Chaumont, where the Chief Surgeon was then located. No office force was at first provided. Transportation was scant and communication by mail and telephone was difficult. Three or four combatant divisions were in France, struggling with their own affairs. Headquarters itself was in the throes of organization. The new directors lacked military experience and each was naturally an enthusiast in his own specialty. The tendency was for each of the uncoördinated branches to solve its own difficult problems. Neither the division surgeons nor the directors knew how plans for expansion, if such plans existed, were going to work out in the new army.

During November of 1917 I had a conversation with one of the directors, which was so explanatory of the confusion then existing that the gist of it is here given. The director said that he had been made responsible for the professional work of his branch for the army in France and that he was to see that there was continuity of treatment for the soldier from the front lines to the rear. He had been thinking of the magnitude of his task and was able to see how he could supervise the work of the medical officers in the front lines so that soldiers could receive the proper treatment. He was also ready to believe that the hospitals in the rear could be so organized as to perform professional work of a character about equal to that done in civil life. His great problem seemed to be to arrange for the transportation of soldiers needing the services of his special division from the firing line to the base. He had contemplated going to Paris to talk over with a great non-medical authority this part of his task. It developed that his idea of the organization of Medical Department transportation did not go much beyond the movements of individual ambulances and that he had no knowledge of sanitary trains, ambulance companies and the other units, nor of the immense amount of thought which has been given to the question of medical transport from the days of Baron Larrey, through those of Letterman, to our own time. The conversation brought out graphically how complex was going to be the definition of the line between professional and administrative control. As a matter of fact, this director had nothing to do with transportation.

General Orders No. 34, which prescribed a nearly complete and independent system of evacuation and hospitalization for venereal cases alone, is another good example of the sort of thing which arose from the overlapping of interests, mistaken enthusiasm and misconception of military organization existent in the special divisions. The fact that such an order was approved for publication tends to demonstrate both a lack of coordination of the special services with other branches and a great willingness on the part of the Army to accept the advice of the specialists who had recently joined.

It is very certain that the directors in those early days had an inadequate conception of the different administrative zones which their new duties would require them to enter, and of the barriers which regulations and custom have raised between these zones and which they would have to break down completely or take at hazardous jumps. There was much dashing to and fro to find out things which a quiet study of Regulations, the Tables of Organization and the Manual for the Medical Department, or a short course at a School for Medical Officers, would have taught.

When junior members of the special divisions began to arrive and were assigned to combatant divisions, the complications increased. They were not recognized in the Tables of Organization, and the details of arranging for billets, messes and transportation were therefore difficult. The towns in which headquarters of divisions were located were usually small and crowded. The general, his personal aides, and the general staff sections were billeted together and had one mess. The heads of the departments, including the division surgeon and sometimes the sanitary inspector, had another mess; there were one or more junior messes. Usually there were not enough medical officers to form a mess, nor was it considered good policy to separate the division surgeon from his colleagues in the other departments. So it came about that the specialists found themselves either assigned for billet and mess to hospitals over which the division surgeon had control, or at division headquarters in a mess consisting of transients and officers of junior rank. Assignment to hospitals separated them from the division surgeon, because medical organizations were not usually in the same town as headquarters, and it placed the consultants in an isolated position where they could not best perform their functions, which were divisional in their application. These complications now seem trifling, but they led to the disturbed feelings which impaired the usefulness of the junior consultants.

Division surgeons were usually of the Regular Army and trained along the lines of military administrative control. The specialist presented a new problem, and one of which the division surgeon had not been sufficiently informed. One can readily understand his problem by considering the arrival of two officers, one reporting as a medical officer and the other with orders for assignment as division urologist or orthopedist or psychiatrist. The first was assigned to a battalion or a field hospital by the usual orders. His place was fixed by the Tables of Organization and was understood by all. He expected no special transportation and joined his organization for any duty assigned him and found his recognized place in billet and mess. The other probably arrived in an automobile loaned him by the Red Cross or by his special division. Perhaps he had a letter of introduction to the division surgeon. At least he bore papers showing that he represented a special service and was to be a part of the office of the division surgeon. The division surgeon, being loyal, greatly desired to carry out the policy implied in this officer's arrival. He had the choice between taking him into his own overcrowded office, forcing him into a mess where he was not wanted because of inadequate facilities, and because he did not hold one of the positions which entitled him to membership, urging a harassed billeting officer to make room for him in a jammed headquarters town,

or sending him to a hospital where also he was at once regarded as a person apart. If placed at the hospital, the question at once arose as to whether he was under the commanding officer, whether he could go and come as he pleased, whether he was to personally care for patients, whether he went on as officer of the day. If he had a machine, was the unit to maintain it and supply the gasoline, and if not, how was he to make his inspections of a division occupying a line of some 20 miles or a billeting area of many towns? The specialist was thus brought out in sharp contrast to the average medical officer. If he was not tactful, and he was not always so, his position was a difficult one. The division surgeon found it hard to make the arrangements even in billeting areas, and when battle conditions ensued the situation was almost impossible.

There was a double allegiance due from the consultant, to his director and to his division surgeon, which he frequently did not understand and exercise with wisdom. Analyzed, it was really the staff relationship, which is as old as the army, but the new officers had not the military experience to grasp it. The division surgeon was often importuned to carry out projects which he regarded as impracticable or which, if practicable from the medical point of view, were disapproved by higher non-medical authority for local reasons; sometimes he was made to feel that the suggestions emanated from higher authority and that if he failed to follow them he would meet the displeasure of this vague power. These were examples of staff action improperly applied.

By the spring of 1918, several divisions were in the firing line and additional divisions were arriving rapidly. As corps and armies were formed, the complexity of the situation for the special divisions increased normously. All of the little animosities which have been hinted at in previous paragraphs were in full play. Medical officers in administrative positions, as well as the specialists, knew that a defective scheme was in operation. The office of the Chief Surgeon had moved to Tours, while the headquarters of the special divisions remained at Neufchateau, partially controlled by a Director of Professional Services, who had his headquarters at Chaumont. All branches were still coördinate and there was much confusion of activity, too many orders, too many reports, too many inspection trips; uncoördinated ideas were surging up from below and until April there was lack of effective administration from above. The functions of the specialists were not well defined and there were many different methods of handling the problem of the special branches.

It was interesting to observe the ways in which the administrative medical officers of divisions, corps, and armies, worked out the problem of the special services. There were those who took advantage of the advice given by the specialists and tried to apply it to the military

machine in an orderly way. Others, harassed by their many responsibilities, followed the plan of keeping the specialists busy, too busy, as the saying was, to allow them to think up new schemes. Another class of men advocated getting them out of the way by sending them off on long trips of inspection or on special missions. Still another policy equally unfortunate in its results was to follow blindly the recommendations of the consultants, putting the blame upon them when their overly enthusiastic ideas proved impracticable of application in the military service.

Some of the special services had obtained an earlier start on organization than others. Having been associated in those early days with the Director of the Division of Orthopedic Surgery, I have always had in mind the work of that branch when considering the great advantages accruing from the establishment of the Professional Services in the Army. Major (later Colonel) Joel E. Goldthwait crossed the ocean for the second time in October, 1917. He had made one trip to England to study the organization of the orthopedic surgeons in the British Army and had returned to Washington to report his findings, with recommendations, to the Surgeon General. During his second trip he was accompanied by some fifty orthopedic surgeons selected by him for duty, first in England and later with the American Army in France. He occupied his entire time during the voyage giving instruction in both orthopedic surgery, as applied in military life, and the details of Army Regulations and customs and administrative methods, to these junior officers, and in obtaining from medical officers of the regular establishment, who happened to be aboard, further knowledge, for his own use, of the usual army methods of dealing with medical problems. He was busily engaged in reading Army Regulations, The Manual for the Medical Department, and the Tables of Organization. He realized that the Army was an ancient, essentially conservative institution which could not be made over in a day, because it was a part of the evolution of nations and represented the product of so many minds that it could not be greatly and suddenly changed by the enthusiasm of any one man. He knew well enough what he desired to do for the Army and what his specialty offered it, but his concern was to learn to work with the organization along accustomed lines. Because of this study, when he arrived in Neufchateau, where one combatant division was already established, he was able to understand promptly how he could best apply to this pioneer division what he later desired to put into effect for the entire army.

One of Colonel Goldthwait's early activities was typical of the good which the special branches were able to accomplish and illustrates how

quickly a man recently from civil life, if he approaches the problem in the right way, can accomplish things in the military establishment. There were a great many men in the combatant division then in Neufchateau who had physical disabilities, of which flat foot was the chief example. Colonel Goldthwait had observed, during his first trip to Europe, how the British handled these men, and desired to have the opportunity to do the same in the American Army. He therefore approached the division surgeon with a scheme which answered the professional requirements and asked him to apply it in a military way; so teamwork came into play and an organization was presented to the commanding general which at once obtained his approval, and the Orthopedic Training Battalion came into existence and accomplished such excellent results that it was later applied on almost the original lines to the whole army in France.

Really there were such immense advantages in connection with the organization of consulting staffs that there was regret that these valuable services, generally, were being allowed to make their own way and were getting so poor a start due to lack of a definite program. The office of the directors at Neufchateau was gradually organized and was assigned an adjutant and other personnel. Although much time was lost, many good things came out of the office, in the form of advice to the junior consultants, special manuals, such as the Splint Manual, and circulars dealing with the prophylaxis of venereal disease, the prevention and control of epidemics, and many other subjects. After April, 1918, when he was appointed, and particularly after the new organization orders were issued, Col. William L. Keller, Medical Corps, as Director of The Professional Services, solved many problems and with great tact and patience performed his most harassing task. Circular Letter No. 25 was issued from the office of the Chief Surgeon in June, giving definite organization to the Professional Services. This circular was based upon and elaborated General Order No. 88, G. H. Q., A. E. F., June 6, 1918. With minor modifications the organization established by it was still in existence at the time of the armistice, and it must, therefore, be accepted as the result of the experience gained in the World War.

An analysis of the circular in question (see Appendix II) shows that there were named for the American Expeditionary Force a Director of Professional Services with a Chief Consultant, Surgical Service, and one for the Medical Service, and, in addition, Senior Consultants in the special subdivisions of Surgery and Medicine, Division Specialists and Consultants for Base Hospital Centers, and other formations.

The functions of the director were to "supervise the professional activities of the Medical Department, A. E. F., and coördinate the work of the consultants and specialists of the Medical Department."

The chief consultant of the surgical service was to supervise the surgical sub-

divisions and organize and coördinate them in such a manner as would permit him to anticipate necessary changes in the personnel. He was made responsible for the proper formation of surgical teams, maintaining lists and records of the teams, receiving the monthly reports of the teams, and he was to make recommendations regarding inspections as to technical procedure and instruction, the detailing of operating surgeons and of members of the teams and the appointment of surgical consultants.

The chief consultant of the medical service was directed to supervise all medical subdivisions and make the necessary recommendations to insure a high professional standard and complete harmony among his assistants.

Senior consultants, under the supervision of the director of professional services and the chief consultants, coördinated professional activities relating to their specialties and made recommendations regarding instruction of consultants and specialists working under them.

Senior division consultants were appointed to tactical organizations, the equivalent of an army corps, and supervised the work of the division consultants. The term was made necessary by the fact that at the time Circular No. 25 was issued there was doubt as to whether corps would operate as administrative units or not, and senior division consultants really were corps consultants.

The chief function of the senior division surgical consultant was to make such frequent visits as would afford a complete survey of professional instruction, surgical technique and methods of treatment in use in the various divisions, and to render such reports and recommendations to the chief surgical consultant as would promote a free interchange of suggestions and effective coördination with the other professional services. He was a supervisor of the professional activities of all consultants, operating teams, and operating surgeons under him, and he was supposed to study the individual capabilities of the men with a view to their selection as useful members of modern surgical teams. Responsibility for the organization, efficiency and distribution of surgical teams was placed upon him so that there might be available a sufficient number of these teams to meet the increasing demands of new formations arriving in France. He was expected to coördinate the activities of his branch in the divisions, to bring about high surgical standards with elimination or reassignment of those who fell below the requirements, and he was to spare no effort to promote professional harmony and unity of treatment.

The senior division medical consultant had similar duties.

The division surgical consultant was required to supervise the immediate surgical activities of operating teams within his division, and, during active periods, if evacuation hospitals were not established, to look after the operative work of teams handling non-transportable cases, the teams themselves, however, to be under the senior division surgical consultant.

Division medical consultants supervised the immediate medical activities of the division.

Circular No. 25 outlined the relation of the division surgeon to the consultants somewhat more fully than had been done formerly. It stated the division surgeon would be so occupied with details of organization and administration, with the care of sick and wounded and their evacuation, that it was not believed that responsibility for technical surgical work, which at times it was necessary to do within the division, should fall upon him; therefore, the direction and supervision of the purely operative side was assigned to the surgical consultant. It was made clear that the division surgeon was to supply the necessary hospital facilities, supplies and personnel,

except of the teams, and he was to spare no effort in promoting harmony. An orthopedic surgeon, a urologist and a neuro-psychiatrist to be appointed from the division medical personnel were to perform their special duties under the direction of the division surgeon, and, in addition, such other duties as the exigencies of the service might require.

Consultants for hospital centers were to be appointed on the recommendation of the chief consultants in medicine and surgery, and the organization of base and general hospitals and other hospitals, so far as practicable, were outlined in the following table:

ORGANIZATION OF BASE AND GENERAL HOSPITALS

Surgical Services:

Chief of Service—
- 1st Section—General Surgery
  - General.
  - Chest
  - Abdomen
  - Fractures.
- 2d Section—Orthopedic Surgery
- 3d Section—Urology.
- 4th Section—Head Surgery
  - Brain (also Neurological).
  - Ear, Nose and Throat.
  - Eye.
  - Oral (Face and Mouth).
- 5th Section—Roentgenology.
- 6th Section—Dentistry.

Medical Service:

Chief of Service—
- 1st Section—General Medicine.
- 2d Section—Neurology.
- 3d Section—Psychiatry.

Laboratory Service:

Chief of Service—
- 1st Section—Pathology.
- 2d Section—Bacteriology and Serology.

The policy announced in Circular No. 25 was the culmination of the reorganization of the special services begun by the appointment of Colonel Keller as Director of The Professional Services. It will be noted that coördination of the different branches was assured through a director. The specialties were also arranged in proper relationship by giving medicine and surgery predominant position over the lesser branches like orthopedic surgery, urology and psychiatry. The new titles unfortunately did not conform to the usual nomenclature of the Army. However, Circular No. 25 was a long step in advance of Circular No. 2, on which the original organization of the special services was based. A very long period of defective organization had ensued before Colonel Keller took hold of the situation, and by the time his system and the circular, abstracted above, had come fully into operation the American Army was intensely busy, and there was little time for

doing much else than stopping up the gaps from June until the armistice arrived.

The immense amount of work done by the special divisions must not be forgotten because of a too detailed consideration of the mistakes of the system. A review of some of the reports of the heads of special divisions will show how important was their contribution.

Brigadier General J. M. T. Finney, Medical Corps, Chief Consultant of the Surgical Service, in his report of December 30, 1918, stated that fairly satisfactory results were obtained so far as the wounded man was concerned. Situations had arisen which demonstrated the necessity for changes in the Tables of Organization, because it had not been possible to fully visualize the needs of his division as a whole and its relation to the sub-divisions and other sections, such as medicine and laboratories. General Finney's appointment on November 10, 1917, the establishment of the office in Neufchateau on January 28, 1918, and the changing of the title of director to that of chief consultant on June 6, 1918, were successive steps in the organization. The appointment of a surgical consultant to each of the four divisions first in France, with the idea of instructing medical officers in their clinical duties, and giving them the benefit of the experience of the consultants with the Allies was one of General Finney's first acts as director. (NOTE: In fairness, it should be remarked that the consultants, while instructing in clinical duties, were themselves taking a much needed course in the organization of the combatant division.) When the divisions went into the line, General Finney found that the services of the consultants were of greater value in the hospitals where definitive surgery was done, and that locating consultants in divisions prevented them from following the treatment of cases through to the hospitals in the rear, because more than one division evacuated to the same hospital. According to General Finney's report, it appears that surgical consultants were appointed to corps when it was assumed that corps were to be mobile, but after the organization of armies, consultants were withdrawn from the very mobile corps, and the solution for the difficulty was to name an army consultant, with sufficient assistants, to carry out the work, and this was put in force in the First and Second Armies, and proved successful for the short time it was in operation. At first base hospital personnel was utilized for the organization of surgical teams and the circular letter of January 7, 1918, led to the formation of fifteen additional ones. Some teams were trained at Evacuation Hospital No. 1, located at Sebastopol in the Toul Sector, but when the activities in the battle line became extreme even teams untrained in military surgery had to be utilized. This was the natural result of not having a sufficient reserve of trained surgeons and because base hospital commanders made it a point to be allowed to keep their own trained men. It was not long after the period of activity began before the necessity for surgical consultants in the large hospital centers became manifest, but such assignments could not be made until late in the war because of the scarcity of trained men. By December 30, 1918, the date of General Finney's report, sixteen of the centers had consultants. Their functions were to supervise, instruct and classify surgeons. Conferences between surgeons on duty in the front lines and in the rear areas had been planned, but were always carried out with great difficulty. Representatives of General Finney's office made frequent inspections of base hospitals and elsewhere, but he remarks that no real follow-up system was established by the Medical Department. The Surgical Service actively concerned itself with studies of a professional character. In January, 1918, a committee was appointed

to find the best method for the transfusion of blood. A special team was organized for surgical work on the thorax and it was organized to carry out certain special observations. The splint teams of the orthopedic subdivision saved the general surgeons a very great deal of work. The shock teams which really pertained to the surgical service had to be manned by medical men because of the shortage of surgeons. A good deal of experience was gained by surgeons belonging to base hospitals by assigning them to mobile surgical hospitals; also the monotony of existence in the rear areas was broken by these tours of duty near the front lines! Many lectures were given at the Sanitary School by representatives of the surgical service.

Brig. Gen. W. S. Thayer, Medical Corps, Chief Consultant of the Medica. Service, opens his final report with observations which show that he recognized the defects in the system of which he was a part. Most of the medical officers of the Regular Army, he remarks, were required for administrative positions and the practice of medicine devolved upon members of the Reserve Corps recently from civil life whose qualifications were unknown. Selection and supervision were very necessary and directors were chosen not only on account of their achievements as professional men but because of their large acquaintance, which made it possible for them to inform the Chief Surgeon as to individuals. Assignment to the office of the Chief Surgeon had been expected and the establishment of a separate office at Neufchateau was regretted. General Thayer mentions the difficulty of making inspections over large areas with the limited transportation available, but such inspections as were made revealed unevenness in the character of both personnel and practice in the different base hospitals, divisions and in the service of supply. One director and assistant director could not possibly cover the ground, and consultants for certain areas were named. Internists were indispensable in actual practice and the assignment of many additional officers qualified for these positions was requested by cable. Medical officers in the front lines were not sufficiently skilled to care for shock and gas cases, and there proved to be insufficient personnel in the surgical service for the formation of shock and gas teams; therefore, emergency medical teams were formed by General Thayer's division. When the army became actively engaged in mobile warfare the emergency medical teams were chiefly called upon for the treatment of shock cases. This was a purely emergency measure and would have become unnecessary with the increasing knowledge among the medical officers at large. (Note: While General Thayer does not mention it in his report, it should be remarked that the bewildered medical officers in the front lines of the Army never did quite straighten out the involved nomenclature and know exactly how to distinguish between gas teams, shock teams, gas and shock teams, and emergency medical teams. As a matter of fact, they were all the same.) The Medical Service gave many lectures at the Sanitary School at Langres.

Psychiatry was established as a division with Major, later Colonel, Thomas A. Salmon, Medical Corps, as director, but it was afterwards subordinated to the Medical Service. Even before the establishment of the Medical Service, Colonel Salmon had placed psychiatrists in the various units. He had a fine base hospital for the care of patients requiring treatment by his section at La Fauche, and also a number of army psychopathic hospitals at the front. Specialists of his branch were found to be so valuable in making expert examinations of defectives and of men about to be brought to trial by court-martial, as witnesses during trial and as experts in the examination of men alleged to have self-inflicted wounds and for the treatment in front line hospitals of soldiers suffering from war neuroses and psychoses,

that the psychiatrist was retained throughout the war in the combatant divisions and his place there was finally recognized in orders. So far as the combatant divisions were concerned this was true of only two other specialties, urology and orthopedic surgery. The work of Colonel Salmon and his colleagues in the education of officers and men concerning the war psychoses was one of the most valuable contributions made during the war.

Another subdivision of the Medical Service was that headed by Lieut. Col. Gerald B. Webb, Medical Corps, of Tuberculosis. One of his first activities was to establish a careful nomenclature, his recommendation having been to include under "Pulmonary Tuberculosis" only those cases with tubercle bacilli and to place all others under the heading of "Tuberculosis Observation." Three centers for the treatment of tuberculosis were established at Base Hospital No. 8, at Savenay, Base Hospital No. 20 at Chatel-Guyon, and Base Hospital No. 3 at Vauclaire. Many visits were required to standardize clinical X-ray and laboratory methods of diagnosis. Much literature was prepared and distributed to chiefs of medical services and to medical officers showing preference for work with tubercular patients. There were also contributions to the weekly bulletin of the Chief Surgeon's office. Diversion of specialists from their own work in tuberculosis was common among the combatant divisions, as was the case with so many other of the specialists.

Of the other branches of the Medical Service, Lieut. Col. Richard Dexter, Medical Corps, had charge of the sub-section of Gas-Poisoning, and occupied himself in instruction and personally aided during the Argonne campaign. Col. Warfield T. Loncope, Medical Corps, in the sub-section of Infectious Diseases was very active in visits and inspections, and made many valuable reports. He also helped to bring the clinical side of medicine into closer touch with the laboratory division.

The Division of Orthopedic Surgery has already been mentioned. It was one or two weeks after the declaration of war by the United States that England requested this country to send base hospitals and at least twenty orthopedic surgeons to England. Colonel Goldthwait selected the orthopedic surgeons and accompanied them to England, and there studied the English service, returning to the United States to report his views to the Surgeon General. At this time splinting was discussed and a board was appointed; the publication of the "Splint Manual, 1917," resulted. Colonel Goldthwait was appointed Director of the Division of Orthopedic Surgery, with Colonels Nathaniel Allison and Robert G. Osgood, Medical Corps, as assistants. Colonel Goldthwait explains in his report the method used for the correction of static defects such as flat foot, weak back, weak knees which occurred commonly in the soldiers who arrived in France with the early divisions. The Special Training Battalion which was originally established in the 26th Division was transferred later and in enlarged form to St. Aignan-Noyers, this at a time when the replacement and reclassification systems were thoroughly organized. In July, 1918, stress for Class C men was so great that efforts to bring defectives up to standard for entry into the higher classes ceased, and short periods of training sufficient to fit men for Class C, and no more, were given. Colonel Goldthwait reviews the large amount of work done in training medical officers in the use of splints. Orthopedic surgeons had to be withdrawn from the British Army and assigned to the American Army for the purpose of examining all the men for defects, to make what efforts they could to have men properly shod and, as has been stated above, to train medical officers in the application of splints. Certain representatives of the Division of Orthopedic Surgery also were given charge of the storage and distribution of splints. Splint teams were organized to supervise splinting, this being necessary not only

in the front-line hospitals but also in transferring men from one hospital to another in the rear. Standardized positions in which to splint the various bone and joint cases were announced and taught; thus travel in France and to the United States was greatly facilitated. Another important work was the organization of the corps of Reconstruction Aides, making it possible to apply physical therapy including occupational therapy. Curative workshops were established.

The Division of Urology was one of those which afterwards became a part of the Surgical Service and made an early start through the appointment of Col. Hugh Young, Medical Corps, who reported June 8, 1917, and then began a study of the British and French services. The Manual of Military Urology was one of the productions of this division. The adoption of a new Regimental Infirmary Urological Set was another. A proper stock of drugs for the special work of the division was acquired at an early date. It was Colonel Young's idea that the establishment through the Red Cross of infirmaries for the treatment of general diseases among the civil population of France would develop the existence and make possible the treatment of venereal infections, thus minimizing the danger for American soldiers. After much work such an infirmary was completed and put into operation at Neufchateau on March 15, 1918. Various routes centering at this institution and covering an area of some 50 miles were established. Properly taught urologists were trained in the new methods at the base hospitals and placed at the ports and with the combatant divisions. Camps for the treatment of venereal disease were established by many of the divisions, but it was later conceived to be a better plan to designate one of the division field hospitals for the treatment of these cases. Camps were permanently maintained, however, with the depot divisions, and there was a very active campaign carried on at the ports. One of the most drastic measures taken during the campaign against venereal disease was the publication of the memorandum of November 25, 1918, which required retention in France of all infected officers and men. The American Red Cross Military Hospital No. 9 at Paris was devoted to the work of the Division of Urology and had three main purposes, the treatment of venereal cases, to act as a school for urologists and to serve as an experimental station. Much work was done by the Division of Urology with regard to the prevention and treatment among American soldiers of scabies and pediculosis.

Surgical Research conducted by Col. G. W. Crile, Medical Corps, was an important sub-section of the Surgical Service. Numerous general researches were carried out and many practical surgical problems studied. Colonel Crile thinks there should be established a Division of Research for the whole of medicine rather than for surgery only, the Board to consist of the senior consultants in medicine, surgery and laboratory, one of these to be selected as chairman. He believes that the activities of the Division of Research should include cooperation with the hospital units and individuals suggesting ideas, supplying them with means for research. He suggests that there should be fuller coordination between the laboratory and clinical side of research. He would establish observation wards and pathological laboratories in the hospitals. He believes that methods in the front areas should be scrutinized and results observed as far as the base where the end results are known. He thinks that a bureau of information should be established in connection with a large library. Colonel Crile says that the casual visits of the consultants are only superficially informing and that consultants should maintain active association with both base and forward hospitals and from time to time have active service. The Red Cross made a fund available for the immediate purchase of supplies and

apparatus for research, but Colonel Crile thinks this fund should be furnished through official channels. He emphasizes the importance of maintaining clinical contact for all the work done by the Division of Research. He believes that the headquarters of the Research Division should be at the headquarters of the Professional Services.

Col. Harvey Cushing, Medical Corps, was appointed June 7, 1918, Chief Consultant in Neurological Surgery, this, after a year with the British. Colonel Cushing brings out in his report that roughly 25 per cent of the casualties involved neurological problems. No separate branch of neurological surgery existed in either the French or British services. His plan was to have teams for this work in the Zone of the Advance, representatives in Base Hospitals and a Neurological Center. He says British experience indicated the value of operating on cranio-cerebral cases in the Zone of the Advance and that this reduced mortality to about 50 per cent. There was not enough work for the neurological surgeons assigned to the forward hospitals and it was found necessary to require them to act as general surgeons when not occupied with their specialty. A frequent result of this was their diversion to other work. Neurological surgeons in the Zone of the Advance often encountered administrative objection to long operations made necessary by great attention to detail and the use of local anesthesia. After the arrival from America of a list of medical officers with experience in nerve surgery, it was possible to assign a neurological team to nearly all evacuation and mobile surgical hospitals in time for the July offensive. A careful set of instructions was written for their operations. In the St. Mihiel campaign, although teams were present, many head cases went to the general teams, and the mortality was high. For the Argonne campaign, two teams were recommended for each of the hospitals likely to receive many head cases and instructions were given to route such cases accordingly. In the rush of battle, however, this was found to be impracticable, and a hospital for head cases only was finally established at Deux Nouds. Between September 29 and October 16, 813 cases were treated at this hospital, but there were many mistakes in routing, Colonel Cushing remarks, and secondary evacuation often delayed the cases ten or twelve hours. The location of Deux Mouds presented great difficulties in evacuation. During the later phases of the Argonne campaign certain beds were set aside at Souilly, Fleury and Villers-Daucourt, and sufficient special teams were assigned and routing orders given. The problem of the neurological surgeon is a special one because retention of the case in the hospital for ten to fourteen days after operation is necessary to avoid cerebral fungus; primary wound closure after debridement is the only safe procedure. In reviewing the work of the Section of Neurological Surgery during the war, Colonel Cushing states that for a battle line which is not moving, teams placed in neurological hospitals give the best results, but for a mobile line, teams should be placed in evacuation hospitals and there should be a neurological center at the base. Efforts were made to have a nucleus of neurological surgeons and neurologists at each center, and Base Hospital No. 115 was started as a special neurological hospital.

Major, later Lieut. Colonel, V. P. Blair, Medical Corps, arrived in France on April 18, 1918, with certain oral and plastic surgical units and was made senior consultant in Maxillo-Facial Surgery, a sub-section of the Surgical Service. The teams were sent to the French and English armies and gradually withdrawn in accordance with American needs. Some of the specialists were assigned to general surgical and dental work and were never returned to their section. Each base and evacuation hospital had one surgeon and one dental surgeon available for maxillo-facial work, but not all mobile surgical hospitals were so supplied. In his interesting final

report, Colonel Blair recalls the fact that on August 7, 1918, the Chief Surgeon requested the assignment of consultants in the various specialties to the chief hospital centers and, to each convalescent camp also, a specialist on the heart and in orthopedic surgery. The Maxillo-Facial Surgical Section was able to make its assignments to each of these centers. Concentration of its cases in one hospital of a center was advised and the presence of representatives of the other branches at the great centers made it possible for the maxillo-facial surgeon to avail himself, when necessary, of the services of the otolaryngologist and the oculist; also a dental surgeon was always available to work with the maxillo-facial surgeon. In authorizing the establishment of the maxillo-facial section the Chief Surgeon instructed that it be a part of the surgical service, but that it take advantage of coöperation with the dental service. Cooperation was carried out between the surgeons of the surgical, dental and maxillo-facial services. As in all other branches, supervision of cases from early to late was regarded as necessary. Colonel Blair gives as causes for failure in certain cases, the lack of beds, making evacuation to the United States necessary, lack of equipment, lack of official instructions, lack of dental surgeons in certain hospitals, notably mobile surgical hospitals, and the diversion of maxillo-facial surgeons to other work, the senior consultant and his assistant having spent a month away from the work of the section as members of an operating team. Colonel Blair made a recommendation in June, which appeared in the Chief Surgeon's Bulletin in October, as to a plan of treatment for maxillo-facial cases. He also made a recommendation in June as to what cases should be evacuated to the United States. This appeared also in the October issue, but before that time many improper cases had been evacuated. Base Hospital No. 115 at Vichy was blocked with general cases, and plans made by the maxillo-facial section could not be fully realized. A school for surgeons and visiting surgeons in oral and plastic surgery was established. Much work was done in selecting proper personnel and in developing maxillo-facial work at hospital centers and schemes for special operative work were thoroughly outlined. Colonel Blair felt that the aims of his section were carried out in large measures.

When Col. James T. McKernon, Medical Corps, became Senior Consultant of Ear, Nose and Throat Surgery, he found that the section of otolaryngology had one representative in each of seventeen base hospitals and that of fifty camp hospitals, about twenty-five of which were functioning, less than one-third had otolaryngologists. The total roster of his section numbered thirty-two. One-third of the base hospitals lacked sufficient instruments and equipment. In his final report Colonel McKernon outlines his work in preparing a supply table and in arranging for examination and treatment rooms, special nurses and equipment, for hospitals not having them. All camp hospitals were finally provided with specialists, instruments and rooms, as were all evacuation and mobile surgical hospitals. Combatant divisions filing requests for otolaryngologists could not be accommodated, because of an insufficiency of special officers. Consultants were assigned to hospital centers and concentration in one hospital of all the activities of the otolaryngologists was arranged. Circular No. 50 of the Chief Surgeon's Office outlined the care of the class of cases applying to this division, and its publication immediately diminished unnecessary operative work. The senior and other consultants were available upon request from the specialists at hospital centers. Severe cases were routed to Base Hospital No. 115 at Vichy, where there was a special staff. A working schedule for classification and standardization of ear cases was prepared, which tended to simplify the work of the Medical Department as well as that of the Disability Boards. To show the growth of his

department, Colonel McKernon mentions that on December 18, 1918, there were 238 officers on duty and twelve held in reserve. On account of lack of sufficient work for otolaryngologists assigned to the evacuation, mobile and field hospitals, Colonel McKernon believes that only those competent to become members of surgical teams should be assigned to this part of the Zone of the Advance. In large centers consultants are essential. In addition to operative work, they should be utilized in instructing in modern methods of otolaryngological surgery. Colonel McKernon believes that one or more specialists of his section should be assigned to each combatant division to avoid the evacuation of minor cases.

Lieut. Col. Allen Greenwood, Medical Corps, was Chief Consultant in Ophthalmology. In his final report he recalls the difficulty which he encountered because base hospitals had small and inadequate equipment. He states that Base Hospital No. 36 at Vittell illustrated the advantage of having hospitals provided with an initial equipment. Colonel Greenwood visited all the hospitals and built up clinics or combined clinics in centers. Conferences were held at hospital centers and he found that these conferences and visits to the hospitals and consultants stimulated them to better work. A Base Optical Unit and eight auxiliary units were organized in the United States and arrived in France on May 4, 1918. As in so many cases the equipment and men were shipped separately and part of the equipment arrived in July and the rest in September. The delay in replacement of lenses was never made up fully. The repair shop was built in July but was not in full operation until October, 1918. The auxiliary units were sent out to various hospitals and an enormous number of prescriptions were filled in spite of the lack of equipment. The auxiliary units were in great demand and additional ones were formed from opticians found in the base optical shop, in base hospitals and in other already existing units. Colonel Greenwood believes that the formation of mobile units for the future would be worth while, but during the World War the armistice cut short his plan. Because of the disastrous mental effects noted among the blinded Canadian and Australian soldiers, the section in ophthalmology had much work in retraining the American blind before sending them back to the United States. Colonel Greenwood came to the conclusion, as a result of his experience, that base, evacuation and mobile surgical hospitals should have ophthalmologists, but that they were not necessary in combatant divisions, and he believes that the ophthalmologists assigned to evacuation and mobile surgical hospitals should be men competent to work on general operating teams. Refraction for combatant divisions should be done at evacuation hospitals. If the work for the ophthalmologist in a base hospital is light, ear, nose and throat work could be added to his task. Concentration of all of the clinics at hospital centers should be arranged. An eye hospital should be established to accomplish the proper routing of cases and should be used also as a center for instruction. Base Hospital No. 115, the hospital for head surgery, was designated for eye work also, but this occurred late in the campaign.

In the preceding paragraphs, the reports of the chiefs of the various branches have been abstracted. It is repeated that one must not permit his prejudices to obscure recognition of the magnitude of the work of the special divisions nor of the good they did. During the war, when the point of view was restricted, vision was short because of local conditions, and men ascribed all sorts of reasons for the difficulties arising with reference to the special services. One opinion often expressed was that the

highly successful men who came into the army from civil life were, by reason of years of private practice, individualists, meaning that they were men who could work alone but were not adapted to teamwork. Another group thought that the Regular Army medical officer, usually found in responsible administrative positions, had been so narrowed by routine that he was unable to grasp the significance and the value of what the eminent practitioners of medicine from civil life were offering the Army. Much feeling was aroused among medical officers in general, and among the specialists, by the fact that the consultant was marked out in sharp relief against the drab background of the ordinary practitioner.

As was stated in the opening paragraph of this paper, the roots of the trouble lie deep in the organization of the Medical Department and of the Army. There were diverse elements which led to weakness in the organization of the professional services during the World War. At the very beginning the Army desired the help of members of the profession in civil life and found that years of isolation had so separated the military and civilian branches that there were tremendous difficulties connected with the mere listing and classifying of those who could offer valuable assistance. All sorts of medical men in civil life desired to help. The path of least resistance was chosen by many, and this was to accept a commission, go to school and enter the service as medical officers in regular course, but those doctors who had achieved eminence in the profession and had much of great value in special lines to offer found that there were no ways open, no channels of communication existed between the organized societies of medicine in civil life and the Surgeon General's office. The establishment of the medical sections of the Council of National Defense offered places for a few, and as the program of the special divisions in the offices of the Surgeon General and of the Chief Surgeon, A. E. F., slowly developed, other men found positions of usefulness. The Tables of Organization and the Manual for the Medical Department were silent so far as consultants were concerned, and no precedents or customs of the service helped to give either the specialists or the administrative officers of the Army light on the subject of the functions of these new elements in the medical service.

The Surgeon General is always busy, but never busier than in time of preparation for war. He is then overwhelmed by military affairs and the expanding relationships with civilian medical committees and societies. The need of organization of this latter part of his office was shown in the early phases of the World War. The Medical Corps of the Army had not specialized, as had the general profession. It was not well prepared to receive and apply specialism. Lists of personnel were

lacking or defective, and square men were placed in round holes as a result; psychiatrists became ambulance company commanders, and great surgeons left their careers behind them and became administrators. Effective liaison between the Surgeon General and the organized profession in civil life is needed, not in preparation for war alone, but all the time. The appointment of an officer in the office of the Surgeon General to organize Civil Relationships is indicated.

The directorates of hygiene and pathology now established in the Medical Department of the British Army point the way for our own organization. As stated in the *Lancet* for May, 1919, the objects of the directorates in the British service are to utilize the benefits of new knowledge through close coöperation between those working inside and outside of the service. Initiation and control of research are sought, and it is believed that the establishment of the directorates will raise the standards and offer inducements for specialists. Advisory committees of both military and civilian persons have been named to aid the directorates. In our own service an abundance of material is offered by civilian members of the profession, and all that is necessary in order to utilize this wealth of material is to bring it together and apply it in orderly form.

Of course there is no reason for believing that the specialist is any more of an individualist than any other medical officer of the Army; also the medical officer of the Army is about as much of a specialist as any one of those belonging to the special services. Every medical officer taking part in the war, whether he was a specialist or not, was an American graduated from a medical school; he had practiced general medicine for a while, and, in the case of the consultant and the medical officer, especially of the Regular Army, had then begun to specialize. The post-graduate school of the army specialist was at Leavenworth, and he gained experience on the border and at the maneuver camps. He specialized in sanitation, the care and discipline of the soldier and, more particularly, in transportation, administration and the field tactics of the Medical Department. To a degree, it is true that every doctor is an individualist in that he is restricted by the limitations of his own brain and his own hands, and medicine is a profession which does not tend to bring about combinations and teamwork. The very best men in the profession in America offered their services for the war, and it is absurd to search except in the system itself for the cause of the weak organization and its poor application.

General Morrison, in his lecture to students at Leavenworth, used to say that when war began the time for preparation ceased. The truth of this assertion granted, it follows that a program to solve the riddle of the

consultants must be sought now while no war threatens and while the men with recent experience still live. In outline, the scheme here presented consists of three main elements: the maintenance of a classified list of all medical men in the permanent and temporary military service; giving the regularly organized and recognized medical societies a representation in the formation of this list and in The Professional Services; organization of The Professional Services in all units from the Surgeon General's office down. Recognition of the services in the Tables of Organization and publication of their well-defined functions in the Manual for the Medical Department are essential. It is proposed that the organization be elastic, reduced to skeleton form in times of peace and brought to full strength in preparation for war.

During the expansion period preceding any war there is a time when the members of the profession in civil life manifest an enthusiastic interst in the medical affairs of the army; on the other hand, the Medical Department reciprocates by giving a heightened welcome to offers of civilian aid. Efforts to maintain, in peace time, this mutual interest which is vital to success in war but which tends to disappear in quiet intervals, have been made, as illustrated by the organization of the Reserve Corps. Great and powerful societies of medical men representing every phase of professional activity have grown up in America. Through state organizations, their committees, the medical press, and the influence of individual members, they sway medical thought, control professional publicity and come into intimate contact with political bodies, both civilian and military, including the Regular and National Armies, the Militia and the corresponding Reserve Corps. Undoubtedly the Surgeon General must give much to these societies and take more from them. The highest success of the Medical department demands the sympathy and support of the profession at large. It needs its political influence, its knowledge of personnel, its keen interest in progressive medicine; it can utilize to good effect all the civic relationships, the educational contacts and the publicity which the societies have to offer. Orderly coördination of these important Civil Relationships of the Surgeon General is manifestly a vital part of the plans for the future.

An essential feature of the program for the utilization of the medical resources of the country in time of war is the immediate establishment of a permanent division in the office of the Surgeon General, to be called The Professional Services. To escape confusion in nomenclature the term "division" should be avoided and this new section designated the Professional Services, with an Officer in Charge. In The Professional Services there should be the surgical section and the medical section, with sub-sections representing the so-called specialties. To

make the organization elastic, all of the present sub-sections should be named and their functions outlined, but because of exigencies which may arise in the future, the way should not be closed for the establishment of new sub-sections. Twenty years ago there would have been no X-ray sub-section, for instance, and in the future there may be some now undreamed of specialty which it will be necessary to include in the list. The establishment of The Professional Services in the office of the Surgeon General would make possible the supervision of medical practice in all lesser units. The Medical Bulletin issued by the Chief Surgeon in France might well be continued, in enlarged form, by The Professional Services, and published for the entire Medical Department, active and reserve, giving end results, comparative statistics, and new procedure applicable in the army. The Professional Services would be coördinated with other branches of the Surgeon General's office exactly as are the other divisions, and in its necessarily close relations with the profession at large, the schools, the societies and journals, the liaison officer appointed for this purpose should play an important part. Civilian committees appointed by societies of medicine and surgery and of the specialties to work with the sections of The Professional Services should result from the activities of the liaison officer and be coördinated by him.

The list of professional personnel, in the beginning, should consist of all medical officers now in service, whether active or inactive. The Personnel Division of the Surgeon General's office offers the medium for its maintenance, and it is suggested that the personnel officer be in charge of the list and that he be aided by the following officers in the Surgeon General's office: The Officer in Charge of The Professional Services; the Liaison Officer in Charge of Civil Relationships; the officer in Charge of the Coördinating Division. This permanent body of officers should be brought into contact with the profession in civil life through the means of representative committees from the various societies. The functions of the various members in the preparation of the list are easy to see. The personnel officer in his relations to promotion and assignment, and with an already established office, would naturally assume the administrative part. The officer in charge of The Professional Services with its group of special sections would have large knowledge of qualifications and would aid greatly in classification and in the assignment of specialists. The desires of the societies representing the profession at large would find expression through the Liaison Officer, and the Coördinating Officer would represent the other branches of the Surgeon General's office. The primary classification of medical men now connected with the service should be completed as soon as possible and the rearrangement in rank of those in the Officers' Reserve Corps based on the classification.

After this primary classification and rearrangement according to rank, all temporary officers should come in to the Reserve Corps as lieutenants. Based on the periodic findings of the body of officers having charge of the list and constituted as outlined above, a flow of promotion according to professional qualifications and military experience should be assured. A revision of the list, to take place at intervals of not more than three years and to be based on the findings of the permanent group of officers in charge of the list, would be required.

The establishment and maintenance of a properly classified list of medical men now in the military service is a task of large proportions and an exceedingly difficult and complicated one, particularly if the related subjects of rank and promotion are considered, but it is an essential element in preparedness for mobilization of the medical resources of the nation and must be accomplished. The maintenance of a list of medical men not in any branch of the military service, with our form of government, divided as it is into many states, would probably be impossible, but certainly the official list of those in the military service should be augmented so far as possible by others of men not in the military service having valuable qualifications to offer. The appointment of a liaison officer in the office of the Surgeon General to bring him into contact with the civilian profession would go a very long way toward making the larger list possible.

For all organizations of the Army, of which territorial departments, expeditionary forces, armies, army corps and divisions are examples, there should be established a branch of The Professional Services, to be a part of the office of the medical officer acting as chief surgeon of the organization. There is nothing incongruous about this organization, and when once established, it would be understood by all men with any military experience and would fall in line with accepted military custom as readily as did the establishment of a similar branch for sanitation. If a military organization such as an expedition or a district springs into existence through some military emergency, it is now taken for granted that a chief surgeon will be named and that a place will be made in his office for a sanitary inspector. In the future it should be just as well established that there will be an officer in charge of The Professional Services. The personnel of the sections and subsections may be fixed from time to time in accordance with the importance and size of the unit. It is quite conceivable, for instance that during a campaign in the tropics a sub-section for tropical diseases might become necessary and assume large importance, so that the one sub-section of tropical medicine might become paramount and exceed in its functions and personnel, say the section of surgery. It is also easy

to see that in a small organization, while there might be on paper a place for The Professional Services, the work for them to perform would not be of sufficient importance to have even an officer in charge of the whole just as there might not be a sanitary inspector, the chief surgeon himself assuming the duties of the vacant offices. Nevertheless, the machinery would be in existence in case necessity required any one of the sections to come into activity.

If the officer appointed by the Surgeon General to take charge of Civil Relationships is possessed of large vision and organizing ability and constructive imagination, he will find himself in a position of great possibilities for useful service. There is no question but that the medical societies, the schools and the journals have always been keen in their enthusiasm in time of war. It will be for the Liaison Officer to keep the fires burning in peace times. He should be able to maintain the interest of the profession by means of many items of news value. The output of research, the laboratories, and hospitals of the service, as scientific contributions, can be given greater circulation if properly presented. The help of the Liaison Officer can be utilized through his contact with schools, the medical press and the societies in recruitment of the Medical Corps, and very extensively in enlarging the Reserve Corps and in preparing the way for expansion among those not willing to enter the Reserve Corps but who are ready to offer themselves in an emergency. In the formation of the committees named by the societies to collaborate with The Professional Services of the Surgeon General's office, the Liaison Officer may again be of great service by arranging for the appointment of men who are selected because of their fitness to immediately take charge of sections in case of war. Members of these special committees will probably often accept commissions in the Reserve Corps because of the interest in the service which they have already manifested by joining the committees. The office files of the Liaison Officer should be crowded with classified information gathered from civilian sources and placed at the disposal of the other branches of the Surgeon General's office. These will doubtless consist largely of lists of names of men with special qualifications which, kept up to date, will become invaluable on the threat of war. The play of relations between The Professional Services and the corresponding committees representing the profession offers a field of great activity for the Liaison Officer. It is not intended that the relations of any office or branch of the Surgeon General's office with members or organizations of the profession in civil life shall be limited in the least by the establishment of a liaison office, but rather that they shall be developed and facilitated by increasing the opportunities and by systematizing the channels of communication.

The organization of The Professional Services in all units as a recognized and permanent part of the medical system will prove to be a stimulus to medical officers to specialize along professional lines. In civil life men strive for the prizes of increased income, greater power and social prestige. In the army, with promotion by seniority, fixed salaries and settled social position, officers strive for the assignments regarded as prizes and, in the Medical Department of the past, these have been largely administrative places. The Professional Services will open the way for high assignment along their chosen lines to a considerable number of army medical specialists.

The advantage to the service in time of expansion of having civilian committees in touch with The Professional Services must not be forgotten. Just at present there are many medical men with military experience, but as the years pass the societies will name junior members to the committees whose only contact with the army and whose best opportunity for gaining knowledge of military affairs will be through membership in these committees. If commissioned in the Officers' Reserve Corps, as it is expected they will largely be, they will progress in rank according to professional fitness and military experience and become more and more eligible for transfer in case of war to an active place in The Professional Services. It is supposed that future wars will demand, as past ones always have, the assignment of the medical officers of the Regular Army to administrative positions, leaving The Professional Services vacant for the reception of qualified men from civil life.

The Professional Services and the corresponding committees from civil life must be so organized as to be elastic. Chart I, accompanying this paper, is intended to show the relation of the services within and without the confines of the office of the Surgeon General. It will be noted that sections are left blank to indicate room for expansion as new specialties develop. Contraction, to do away with unnecessary or inactive sections, is equally feasible. The Sub-Section of Research is placed, in accordance with Colonel Crile's excellent suggestion, under the Officer in Charge of The Professional Services, equally associated with the Sections of Medicine and Surgery, and with direct coördination with the Division of Hospitals and of Laboratories. As with all the other sections and sub-sections, there will be a corresponding civil committee for the Research Sub-Section.

The Professional Services must be elastic in personnel as well as in function. In time of peace it is not to be supposed that medical officers of the Regular Army can be spared in sufficient numbers to fill even the various sub-sections of the service assigned to the office of the Surgeon

General and much less so to lesser organizations. For periods of inactivity it would probably suffice to have officers on duty with the Surgeon General's office in charge of the service as a whole, of the Sections of Medicine and Surgery and perhaps in the Sub-Section of Skin and

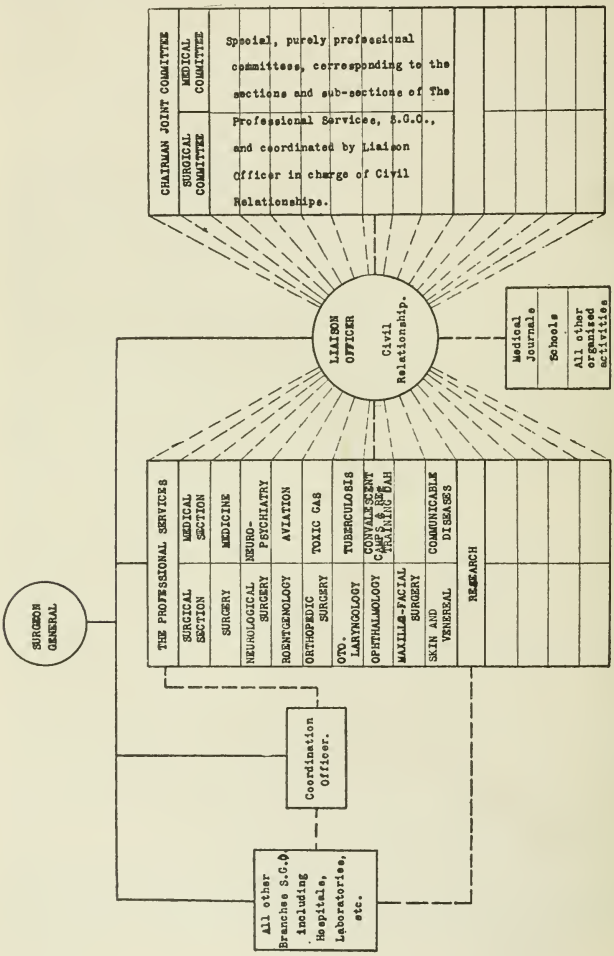

Chart I.—The Relations of the Professional Services, Surgeon General's Office.

Venereal Disease and Research. In case of expansion for an expeditionary force, the size of the force, the geographic location of the struggle, and many other conditions would enter into the determination of the personnel of The Professional Services. Combination of various sections is practicable, as, for instance, those of Communicable Diseases and Tuberculosis or Otolaryngology, Ophthalmology and Maxillo-Facial Surgery. The experience of the World War proved that specialists must be men of broad, basic training; the orthopedist and the neurological surgeon must also be general surgeons if occasion demands; the officer who aspires to become head of a Section or of The Professional Services should be a man of many sympathies, but it will not be to his disadvantage to have had great experience in one branch. While it is not intended to place administrative duties upon members of The Professional Services, they must be men of sufficient experience to appreciate the necessity for organization and be ready to work as harmonious elements of the army.

In the lesser organizations of the Army, including departments, districts, expeditionary forces, armies, corps and divisions, it seems good organization to apply exactly the same system as is maintained in the office of the Surgeon General, but to fill the sections and sub-sections with only the necessary personnel. Thus an expeditionary force in a World War will have every place filled, with an officer in charge of each sub-section, and with junior officers in the active branches as assistants. Departments are territorial organizations; some are active and others are not; in active departments certain sections will need to be provided with personnel, in others the Department Surgeon will not require such assistance. An army of occupation requires an officer in charge of the Sections of Medicine and Surgery but not much else, while an army occupying an active sector should have the sections pretty fully manned. A corps never needs more than the officers in the Sections of Medicine and Surgery. These can efficiently supervise and coördinate the work of the specialists in the divisions and apply the advice of those in the Army. Also they can keep in touch with the officers of The Professional Services in the mobile, surgical and evacuation hospitals no matter in what administrative zones these institutions are placed by the Tables of Organization of the future.

The division probably offers the hardest riddle of all the units. The three special branches of orthopedic surgery, skin and venereal disease and psychiatry were usefully represented in the divisions during the World War. They must be present in some form in the future The psychiatrist was not very busy, but his work was highly specialized and his presence was well worth while; the orthopedic surgeon was

wonderfully useful in the early phases of the war, but after the defectives were eliminated he became largely a "splint-man"; the skin and venereal specialist was very useful while camps for venereals were in function

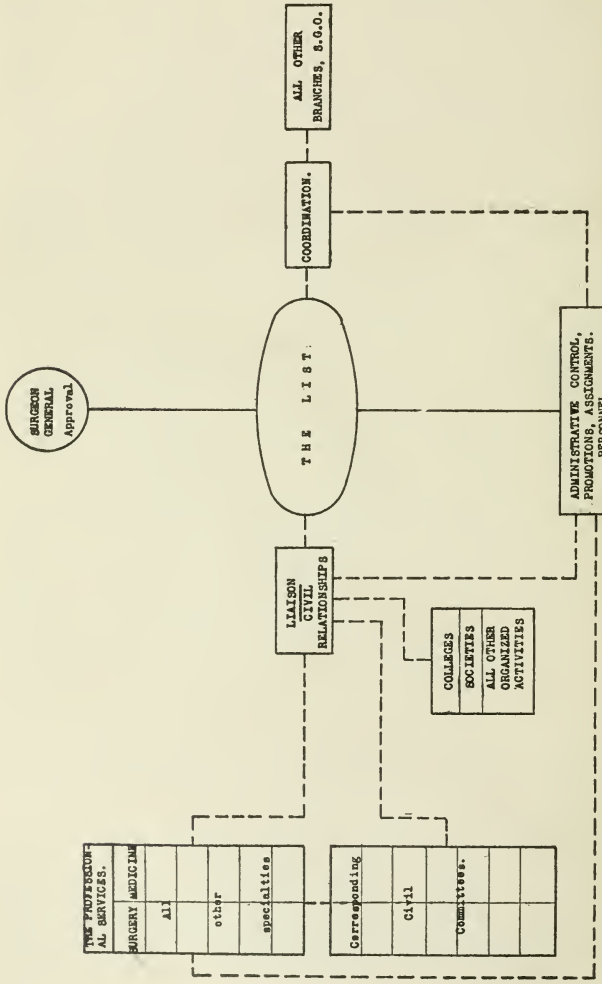

Chart II.—The Preparation of the List of Medical Personnel, Surgeon General's Office.

but an administrative officer generally took over the louse and scabies problems because of the necessity of coördinating delousing, laundering, salvage and re-clothing. There must be no doubt about the definition of the functions of specialists assigned to divisions nor about their recognition in Tables of Organization. It seems clear that wherever they come from they must be a part of the office of the division surgeon. Every effort at other dispositions failed wholly or in part. The authorities object seriously to encumbering division headquarters with unnecessary personnel, and since this is based on well-recognized military necessity, thorough consideration must be given to the question of reducing the number of medical officers to the minimum. In this consideration, however, it must not be forgotten that the division is the chief place of contact between the soldier and The Professional Services. The much emphasized continuity of treatment begins in the division and ends in home territory. Preventive medicine exercises much of its beneficence in the division. With reluctance at giving up the orthopedist, the urologist, and the psychiatrist, I have adopted in this paper the plan of having only two representatives of The Professional Services assigned to divisions in the Zone of the Advance.

These two representatives are officers in charge of the Sections of Medicine and Surgery. The representative in medicine should be chosen with the acquiescence of the head of the Sub-Section of Psychiatry and the officer put in charge of surgery should be assigned after consultation with the heads in Orthopedic Surgery and Skin and Venereal Diseases. Over and over again the final reports called attention to the necessity for having broad, thoroughly grounded men in the special services of the divisions. General surgeons of this sort, properly advised by the specialists in the higher units, can be of great value to the division surgeons in handling the professional work associated with the wounded, and they can satisfactorily pass on the special problems of orthopedic surgery and venereal prophylaxis; the same is true regarding the internist and psychiatry. With a skeleton organization, alike for The Professional Services in all units, it will be practicable to assign representatives of any of the sections for temporary duty in divisions, if local difficulties arise; certainly this will be wise in the case of new divisions and of those located in rear areas.

During the World War, medical organization in the Service of Supply was better prepared than in the Zone of the Advance to receive the specialists. Administrative and professional considerations were not so intimately mixed. The associations were more nearly like those of civil life; control by higher medical authority was closer and more purely professional. The great hospital centers will require a nearly

full group of consultants, but concentration of special patients of one class at a single hospital will make it possible to avoid excessive personnel. In the case of hospitals given up entirely to special cases the

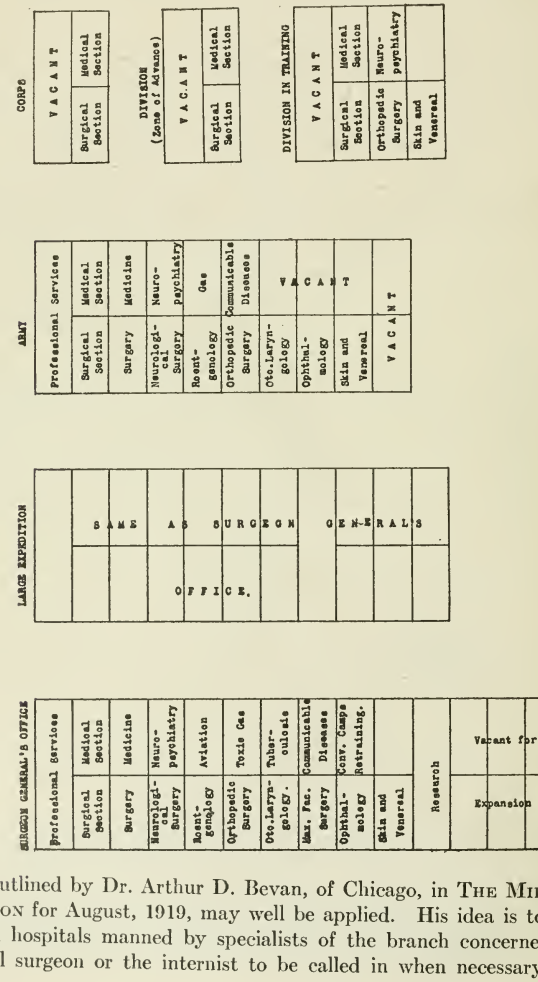

Chart III.—Expansion and Contraction of the Professional Services. The Civil Committees Make Corresponding Changes.

plan outlined by Dr. Arthur D. Bevan, of Chicago, in The Military Surgeon for August, 1919, may well be applied. His idea is to have special hospitals manned by specialists of the branch concerned, the general surgeon or the internist to be called in when necessary. To

mould his plan with that here outlined will not be difficult. All that is necessary is to fill the sub-section corresponding to the class of cases received and leave vacant the Senior Sections of Medicine and Surgery. For instance, in a hospital for eye cases, the Sub-Section of Ophthalmology would have an officer in charge, while the Section of Surgery would not be represented except, perhaps, by an officer of the Sub-Section of Surgery and junior to the ophthalmologist.

During the early phases of the development and maintenance of the Classified List already mentioned, many difficulties will be encountered. So far as the Regular Army is concerned, they may be overcome by progression along established lines. There are already lists, undoubtedly classified, perhaps not in black and white, but certainly in the minds of those who control the destinies of individual medical officers. A revision of the list of subjects for entrance and promotion examinations can be made at any time, under existing orders, to afford any necessary data in regard to the special qualifications of members of the Medical Corps. Also officers are being given increased opportunities in the military hospitals for showing what they can do. The efficiency reports give information as to what lines officers have followed and the relative success of their efforts. Assignments can readily be made in accordance with the classification whether or not promotion by selection is adopted for the service. Temporary officers on active duty would be listed and classified exactly as are regular officers.

For the present members of the Reserve Corps, surely the difficulties of classification are not insurmountable. Age, position in civil life, length and relative success of military experience and acceptable performance of duties in positions of responsibility are probably the chief elements in the primary classification to determine rank and skeleton assignment. After a certain time no one should be admitted except through the lowest grade and on recommendation of the board having charge of the Classified List. Promotion must be by selection and in accordance with carefully prepared regulations. It will probably be slow in time of peace and rapid in case of expansion. If the board is constituted as outlined in earlier paragraphs, giving full representation to the profession in civil life, its periodic findings will probably be more acceptable to medical men generally than have the methods of the past. The board should be controlled by regulations known to all concerned and fair to all, but full elasticity should be preserved to allow for emergency expansion and for exceptional cases of advancement in rank or change in assignment to meet the interests of the service. A study of Chart II will show that while ample coördination is provided for the organized profession in civil life and The Professional Services and other

PEACE

SURGEON GENERAL'S OFFICE

Professional Services	
Surgical Section	Medical Section
Research	
VACANT	VACANT

DEPARTMENT

Professional Services	
VACANT	

EMERGENCY DISTRICT

VACANT	
Surgical Section	Medical Section
Orthopedic Surgery	Communicable Diseases
Skin and Venereal	
VACANT	

SMALL EXPEDITION TROPICS

Professional Services	
Surgical Section	Medical Section
Orthopedic Surgery	Neuro-psychiatry
Skin and Venereal	Aviation
	Tropical Medicine
Research	

CHART III-A.—EXPANSION AND CONTRACTION OF THE PROFESSIONAL SERVICES. THE CIVIL COMMITTEES MAKE CORRESPONDING CHANGES.

branches of the Surgeon General's office, nevertheless final approval and therefore control is preserved for the Surgeon General himself. A system of examinations will doubtless be established by the board, but the findings should be based not on the results of the examination alone, but also on the opinions of the four members of the board, representative as they are of powerful groups in the profession in both civil and military life.

If the militia system continues to be a part of the scheme of national defense and militia medical officers are called into federal service, they should be listed and classified, and assigned according to classification. It is impossible with our present laws for the Medical Department to escape any more fully than other branches of the Army the complications arising from the inherent weaknesses of the militia system.

After the Classified List is perfected, after The Professional Services are fully organized, even after the Reserve Corps becomes popular, there will be a considerable number of medical men untouched by military enthusiasm. Unfortunately for the army, in this number will be many of the most successful men in civil life, men who have much of which the Medical Department is in great need, particularly in time of war. They are the men who have one-way minds, whose devotion to a single subject leads to eminence but does not permit of alienation from their chosen career. In part, these useful men will take places on the civilian committees representing their specialties in coördination with The Professional Services. They will not accept commissions in the Reserve Corps in times of peace, but they will form a reserve supply of specialists willing to serve in case of a great war. This reserve will be readily available only in case the Auxiliary List of medical men not in service is organized. The formation of the subordinate list which goes to make up the Auxiliary List should be one of the chief responsibilities of the liaison officer in charge of Civil Relationships. The Auxiliary List may well contain the names also of eminent men, beyond military age, who are serving on committees, and who could be commissioned in times of great expansion to take quiet places in The Professional Services made vacant by demands from the front for all officers of military age.

The moment the question of the list arises with its dependent conditions of promotion and assignment and, most important of all, the project of admitting members of the Reserve Corps only in the grade of lieutenant, there will be protests. The objection will be that many very useful men will not come into the Reserve Corps in peace times and that when the necessities of war make it mandatory to employ them, it is embarrassing to both the Government and the medical men concerned to offer them commissions in the grade of lieutenant. Will not the

development of the Classified List, close liaison with the profession at large, the assurance of a steady flow of promotion in the Reserve Corps, the coördination of civilian committees with The Professional Services

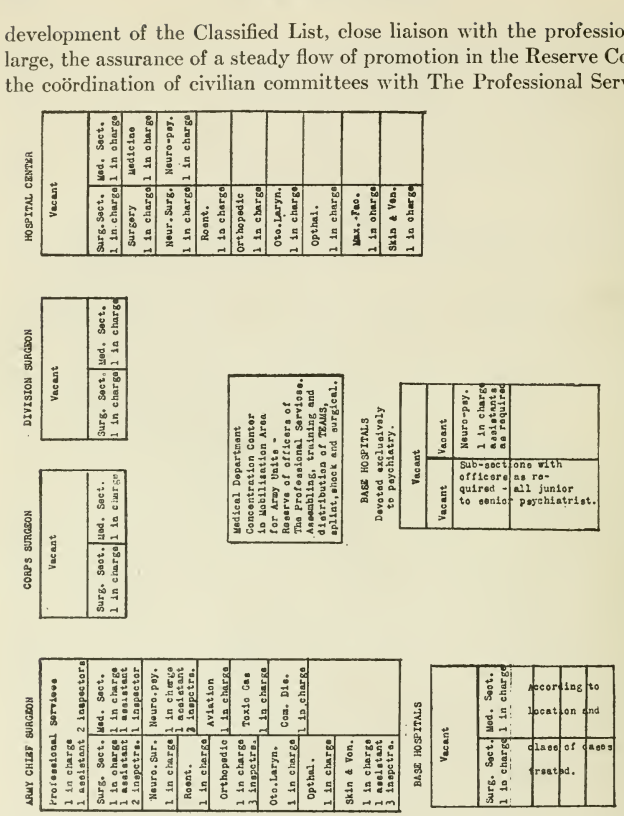

CHART IV.—INDICATING TABLES OF ORGANIZATION FOR PROFESSIONAL SERVICES OF AN EXPEDITIONARY FORCE IN A WORLD WAR.

nearly clear away the objection? Immediate classification of the present Reserve Corps officers and appropriate rank for those deserving it will solve the difficulty for the present. As to the future, the board in charge

of the Classified List should have power to recommend higher rank than lieutenant for men possessing qualifications of such exceptional kind that their services are necessary in an emergency, or at least to pass them rapidly through the grades. The time has come, though, when it is well to state the general conviction, gained in France, that the Medical Department usually can dispense with the services of the surgeon of eminent name, of middle age, of fixed habits of thought who demands high rank but who does not know that a sanitary train is not pulled by a locomotive, nor any other of the intricacies of military organization. Unless the enthusiasms of his youth have led him to the acquirement of the rudiments of military knowledge, he had better stay at home, when he arrives at maturity, and perform a useful service on a civilian committee, or accept the usual grade and gain promotion promptly by demonstrating unusually useful qualities.

A moment devoted to reviewing the application of the system advocated in this paper to the career of a typical individual or two may serve to stimulate the imagination and lead to a clearer visualization of the plan. Take first a medical officer of the Regular Army who has made his mark and received good training in surgery at school. He has had his tour with troops and the Classified List has indicated the advisability of assigning him to The Professional Services, this because of good surgical work performed and his high grade in a promotion examination. As a captain he has occupied a junior place in the Sub-Section of Surgery at a general hospital. Here one of his papers on a research problem has attracted attention. On reaching the time for promotion to a majority he has announced his desire to specialize and has been successful in the examination. After a year in charge of the Sub-Section of Surgery in the Surgeon General's office he has been placed at the head of The Professional Services of a district formed to meet an emergency. His years have given him both administrative and professional experience. He knows the problems of the Army and of the specialists. There has been time for a short course at Leavenworth and some attendance at clinics in the larger cities. The Surgeon General has placed him in charge of the Surgical Section (not sub-section) in Washington. He is here in intimate touch with the corresponding committee from the great Society of Surgeons. War comes and he is needed in an administrative position and leaves for the theater of operations.

The Classified List and the good offices of Civil Relationships aid the Surgeon General in the selection of a successor. Two men, both members of the civil committee on surgery, have been considered. One is chairman of the committee, of advanced middle age, a pro-

fessor, prominent in professional circles; his outstanding qualifications are his broad knowledge of surgery and his great acquaintance with surgeons. The other is of almost equal prominence; he is younger; he has not had the same opportunities for widening his circle of acquaintances. In his youth he has been a member of an operating team in war time; he has been in the Reserve Corps ever since and has attained the high peace-time rank of major; he has been called into active service for a short period for the purpose of taking the special course in military surgery. The liaison officer has reason to believe the elder man will soon be chosen chairman of the Joint Professional Committees and that he will be of immense use in this capacity. The younger man is chosen and called to active service.

The program of organization for the special services presented in this paper is not the product of any one man; it is rather a statement of what the World War taught the service regarding the development of the medical resources of the nation. There was an insistent demand for accurate information regarding personnel; therefore let us establish the Classified List and at the same time increase the Reserve Corps by assuring a steady flow of promotion in peace times. There was ineffective application of the services of valuable men, because the Tables of Organization and the Manual did not define their places and functions and because of initial lack of coördination; therefore let us at once enlarge the Tables and Manuals and inaugurate The Professional Services. Finally, through the efforts of an active liaison officer in Civil Relationships, it will be possible to have an organized profession in support of the Medical Department, as the nation in time of need is always back of the Army.

NOTE: I acknowledge my indebtedness for helpful suggestions to many officers, chief of whom are Col. Joel E. Goldthwait, lately Chief Consultant, Division of Orthopedic Surgery; Col. S. H. Wadhams, Medical Corps; and Col. W. L. Keller, Medical Corps.

APPENDIX I

HEADQUARTERS
AMERICAN EXPEDITIONARY FORCES
OFFICE OF THE CHIEF SURGEON

FRANCE, *November* 9, 1917.

Circular No. 2:

1. The War Department has approved the plan of the Surgeon General's office, creating professional divisions in his office with a director at the head of each division in the United States, and a Director for each division with the American Expeditionary Forces. These divisions are:

1. Division of General Medicine.
2. Division of General Surgery.
3. Division of Orthopedic Surgery.
4. Division of Surgery of the Head.
5. Division of Venereal, Skin and G. U. (Urology).
6. Division of Laboratories.
7. Division of Psychiatry.
8. Division of Roentgenology.

2. For the Expeditionary Forces, Major John M. T. Finney, M. R. C., has been designated as Director of General Surgery; Major Joel E. Goldthwait, M. R. C., as Director of Orthopedic Surgery; Major Hugh H. Young, M. R. C., as Director of Urology; and Lieut. Colonel Joseph F. Siler, M. C., as Director of Laboratories. The names of officers designated for the remaining divisions will be announced later.

Additional officers will be named from time to time as Assistant Directors and Consultants for Corps, Sections of the Lines of Communication, large hospital centers and other areas.

3. The professional authority of Directors, Assistant Directors, and Consultants, within their respective divisions, will be recognized by all concerned and duly respected and observed, it being fully understood that this authority does not in any way include administrative control.

4. The Directors, each for his particular division, will be immediately responsible to the Chief Surgeon, A. E. F., for the work performed in these various divisions. In general, they will direct and coördinate the professional services of all sanitary formations and hospitals so that there will be a continuity of treatment along the lines of recognized approved practice, from the front to the rear, in each professional division

They will also act as consultants and advisers, and when necessary in the interest of the service, they will change professional procedure or inaugurate new methods.

5. In order to carry out these plans, the professional service of Base Hospitals and General Hospitals, and other Hospitals as far as practicable, will hereafter be subdivided into eight sections as follows:

1. Section of General Medicine.
2. Section of General Surgery.
3. Section of Orthopedic Surgery.
4. Section of Surgery of the Head.
5. Section of Venereal, Skin and G. U. (Urology).
6. Section of Laboratories.
7. Section of Psychiatry.
8. Section of Roentgenology.

The Commanding Officer of each Hospital will organize his hospital as indicated, assigning a suitable officer to duty in charge of each section as far as it may be practicable. In making these assignments the professional qualifications of an individual in a particular specialty will receive due consideration. The chiefs of sections will report to the Commanding Officer, to whom they will be responsible, each for the satisfactory operation of his particular section.

A. E. Bradley, *Brig. Gen., N. A.*,
Chief Surgeon.

Approved:
By Command of General Pershing:
J. G. Harbord,
Chief of Staff.

APPENDIX II

AMERICAN EXPEDITIONARY FORCES

Circular No. 25:

ORGANIZATION OF PROFESSIONAL SERVICES MEDICAL DEPARTMENT, A. E. F.

There has been appointed by G. O. 88, G. H. Q., A. E. F., June 6, 1918, for the Medical Department:

A Director of Professional Services, A. E. F.

A Chief Consultant, Surgical Service, A. E. F.

A Chief Consultant, Medical Service, A. E. F.

Senior Consultants in Special Subdivisions of Surgery and Medicine, Division Specialists, and Consultants for Base Hospital Centers and other Formations.

In order to utilize the professional services of the Specialists of the Medical Department, A. E. F., in a manner which will best facilitate complete coördination between forces from front to rear, the following instructions are issued:

Director of Professional Services.—The Director of Professional Services, under the Hospitalization Division of the Office of the Chief Surgeon, will supervise the professional activities of the Medical Department, A. E. F., and coördinate the work of the Consultants and Specialists of the Medical Department.

Chief Consultants.—The Chief Consultants, Surgical Service, will supervise the professional surgical subdivisions in the A. E. F. He will organize and coördinate these divisions in a manner which will permit him to anticipate, as far as possible, necessary changes in personnel so that timely requests for such changes may be made. He is responsible for the proper formations of the surgical teams in the A. E. F. and those attached to the units of the Allies, and he will keep lists and records of the teams whereby the amount and the efficiency of their work may be checked. For this purpose, he will require from each surgical team suitable monthly reports of the number of operations performed and the results obtained. He will make such recommendations as he may deem necessary for inspections as to technical procedure and instruction, details of operating surgeons, details to surgical teams, and appointment of Surgical Consultants in the A. E. F.

The Chief Consultant, Medical Service, will supervise all medical subdivisions in the A. E. F., and will make such recommendations as may be necessary to insure a high professional standard and complete harmony among his assistants functioning in all formations.

Senior Consultants.—Under supervision of the Director of Professional Services and the Chief Consultant in surgery and in medicine, Senior Consultants of the special subdivisions of medicine and surgery will coördinate professional activities relating to their specialties.

They will make necessary recommendations to the Chief Consultant as are deemed necessary for the instruction of consultants and specialists in divisional and other army formations. in order that prompt execution of directions relative to professional subjects may be assured.

Senior Division Consultants.—One Senior Medical and one Senior Surgical Consultant will be assigned to all tactical organizations which are the equivalent of one army corps, and consultants will be appointed in such numbers as may be necessary to assist the Senior Division Consultants. Senior Division Consultants will hereafter be responsible for the duties now being performed by the Division Consultants.

The Senior Divisional Surgical Consultant, under the Chief Surgical Consultant, A. E. F., will be expected to make at frequent intervals a complete survey of the

professional instruction, surgical technique, and the methods of treatment in use in the division, and he will render from time to time such reports and recommendations to the Chief Surgical Consultant, A. E. F., as will promote a free interchange of suggestions and the most effective coördination with the other professional services.

He will supervise the professional activities of all consultants, operating teams, and operating surgeons attached to his division, in a manner which will permit him to familiarize himself with the individual capabilities of the men, with a view to selection, based on observation, of those likely to adapt themselves to modern military surgical team formations, rather than individual work.

He will be responsible for the organization, efficiency and distribution of surgical teams, and he will make such recommendations to the Chief Surgical Consultant, A. E. F., as will facilitate the formation of sufficient teams to meet the constantly increasing demands incident to the arrival in France of new formations.

The Senior Divisional Consultant will also coördinate the activities of the professional personnel in his divisions in a manner that will be conducive to high surgical standards, and elimination or reassignment to other duties of those who fall below the requirements. He will spare no effort to promote professional harmony and unity of treatment in the divisional formations.

Senior Divisional Medical Consultants.—The Senior Divisional Medical Consultant will, by frequent inspections, satisfy himself that the various classes of patients suffering from medical disabilities are receiving the best and most advanced treatment possible. He will report from time to time to the Chief Medical Consultant, A. E. F., the results of his inspections, and make suggestions looking toward the perfection of the Medical Services of the A. E. F.

Divisional Surgical Consultants.—The Divisional Surgical Consultant will, under the Senior Divisional Surgical Consultant, supervise the immediate surgical activities of operating teams within his division. During mobile or semi-mobile warfare, when established evacuation hospitals are absent, the operative work, in formations for non-transportable cases, will be handled, when practicable, by surgical teams functioning under the supervision of the Senior Divisional Surgical Consultant, or his assistant.

Divisional Medical Consultants.—Divisional Medical Consultants will supervise the immediate medical activities in the division to which they may be assigned.

Relation of the Division Surgeon to Senior Division Surgical Consultants and Consultants Functioning with Divisions.—The many details of organization and administration which will devolve upon the Division Surgeon, in the care of sick and wounded and their evacuation, will so tax his time and ability that it is not believed that the supervision of the technical surgical work, which at times must be done in divisional formations, should be added to his already serious responsibilities; therefore, the directions and supervision of the purely operative side of the work done in divisional formations is placed upon the Senior Divisional Surgical Consultant, or his assistants.

The Division Surgeon will supply the necessary hospital facilities, supplies, and personnel other than those forming teams. He will spare no effort in technical coöperation which may promote harmony of action between the professional services with the fighting forces, from the front to the rear.

Division Specialists.—One Orthopedic Surgeon, one Urologist, and one Neuropsychiatrist will be appointed from the division sanitary personnel, and, under the direction of the divisional Chief Surgeon, they will perform the duties pertaining to their several specialties, in addition to the other duties of medical officers which may be required of them by the exigencies of the service.

Consultants for Base Hospital Centers.—Upon the recommendation of the Chief

Surgical and Medical Consultants, A. E. F., there will be appointed for Base Hospital Groups such consultants as may be necessary from time to time. These consultants will at all times be within reach of the Base Hospital Group to which they are attached.

The organization of Base and General Hospitals and other hospitals, as far as practicable, will be made on the bases of three services: Surgical, Medical and Laboratory, each composed of sections coördinated through a Chief of Service designated by the Commanding Officer, who may be selected from any section, ability and experience being the determining factors. In detail, the professiona services of hospitals are divided according to the following:

Organization of Base and General Hospitals

Surgical Services:

Chief of Service—
- 1st Section—General Surgery.
  - General.
  - Chest.
  - Abdomen.
  - Fractures.
- 2d Section—Orthopedic Surgery.
- 3d Section—Urology.
- 4th Section—Head Surgery.
  - Brain (also Neurological).
  - Ear, Nose and Throat.
  - Eye.
  - Oral (Face and Mouth).
- 5th Section—Roentgenology.
- 6th Section—Dentistry.

Medical Service:

Chief of Service—
- 1st Section—General Medicine.
- 2d Section—Neurology.
- 3d Section—Psychiatry.

Laboratory Service:

Chief of Service—
- 1st Section—Pathology.
- 2d Section—Bacteriology and Serology.

Circular No. 2 of this office, November 9, 1917, is hereby revoked.

M. W. Ireland,
Brig. Gen. N. A., C. S.

A. E. F.

DIRECTOR PROFESSIONAL SERVICES
CHIEF CONSULTANT, SURGICAL SERVICE
CHIEF CONSULTANT, MEDICAL SERVICE

Army

Senior Consultant, Surgery, A. E. F.
1. General Surgery.
1. Orthopedic Surgery.
1. Urology and Dermatology.
1. Eye.

Senior Consultant, Medicine, A. E. F.
1. General Medicine.
1. Neuro-psychiatry.
1. Formations, equivalent to an Army Corps.

Senior Consultant, Surgery, A. E. F.
1. Ear, Nose and Throat.
1. Neurological Surgery.
1. Maxillo-facial Surgery.
1. Roentgenology.
1. Research.
1. Formations, equivalent to an Army Corps.
4. Consultants (Assistants to division senior consultants).

Senior Consultant, Medicine, A. E. F.
2. Consultants (Assistants to division senior consultants).
(Others as required.)

(Army Corps)

DIVISION

SPECIALIST: EACH TACTICAL DIVISION

(A part of division sanitary personnel, Tables of Organization)

Surgery
1. Orthopedic Surgery.
1. Urology.

Medicine
1. Neuro-psychiatrist.

HOSPITAL CENTERS

Consultants, Medicine
Each Hospital Center, S. O. S.:
1. General Medicine.
1. Neuro-psychiatry.
(Others as required.)

Consultants, Surgery
Each Hospital Center, S. O. S.:
1. General Surgery.
1. Orthopedic Surgery.
1. Urology and Dermatology.
1. Eye.
1. Neurological Surgery.
1. Ear, Nose and Throat.
1. Maxillo-facial Surgery.
1. Roentgenology.

S. O. S.

SPECIALIST: EACH BASE HOSPITAL

(Part of unit Personnel)

Surgery (as needed)
General Surgery.
Orthopedic Surgery.
Urology and Dermatology.
Neurological Surgery.
Eye.
Ear, Nose and Throat.
Roentgenology.
Maxillo-facial Surgery.

Medicine (as needed)
General Medicine.
Psychiatry.
(Others as required.)

Original Set of Instruments Supplied to all Operating Teams

General operating case	1 (Par. 916 Med. Manual).	
Hemostatic forceps	24 No. 116 and 118.	
Hemostatic forceps, Kocher	12 No. 120	these figures refer to
Scissors, straight	4 No. 109	catalog of standard.
Scissors, curved	4 No. 108.	
Scissors, ½ sharp	2 No. 111.	

Tissue forceps, mouse toothed	2 No. 131, of instruments
Dressing forceps, 5¼ inch	2 No. 130.
Towel forceps	10 No. 134.
Scalpels	16 (8 No. 102; 8 No. 103).
Sharp retractor, four prong	2 pr. No. 151.
Rongeur bone forceps, Hoseley	1 pr. No. 175.
Bone gouge (Sx No. 4, 10 MM)	1 No. 184.
Needles, intestinal (No. 2 and 3 straight)	2 doz. No. 147.
Needles, intestinal (No. 3 and 4 curved)	2 doz. No. 146.
Tourniquet, army pattern	1 No. 140.
Rubber gloves (No. 7-12 pr: No. 8-12 pr.)	24 pr.
Operating gowns, caps and face masks	12 each (optional).

Small Sets Substituted in Place of Original Size Sets Furnished Some Teams

Hemostatic forceps	12 (6 large if possible).
Sharp retractor	1 pr.
Dull retractors	1 pr.
Aneurism needle	1.
Elevator, periosteum	1.
Scissors, straight, large	2 pr.
Scissors, curved, large	2 pr.
Scalpels	8.
Forceps, Rongeur	1.
Intestinal needles, straight	24.
Intestinal needles, curved	12.
Strong, full bayonet pointed round needles	12.
Plain catgut	4 doz. No. 1.
Fine black silk	1 spool.
Razor	1.
Curette, large	1.
Mouth gag	1.

EXPERIENCE WITH A GASTROINTESTINAL SERVICE IN AN ARMY HOSPITAL

By JOHN L. KANTOR, M. D.

I. ORGANIZATION AND METHODS

THE "Section of Gastroenterology" of the medical service of United State Army General Hospital No. 14, Fort Oglethorpe, Georgia, was organized June 2, 1918, and continued in operation until June 15, 1919. The personnel consisted of the writer and from one to three other medical officers, plus a varying number of nurses and corps men, depending upon the number of patients. The bed capacity varied up to 130 as a maximum, one or more of the ward units of the hospital plant being set aside for this service. About 80 new cases were seen each month except during the last trimester of 1918, when the service was suspended almost entirely because of the "influenza" epidemic.

The special equipment consisted of stomach tubes with Ewald evacuators, duodenal tubes and accessories, a set of esophageal bougies, a proctoscope, a microscope, and the necessary glassware and reagents for the examination of fresh specimens from the digestive tract. Experience showed the advisability of maintaining a small laboratory room as an integral part of the organization. Appropriate arrangements were made for cooperation in diagnosis with the surgical, laboratory, and Roentgen departments of the hospital, and for aid in treatment, with the special diet kitchens, the dental service, and the genitourinary section.

The routine procedure in gastrointestinal cases was as follows: Immediately on admission to the service, the patient was restricted to the ward, was weighed, and was given a standard milk and egg diet. This diet consisted of a pint of milk and two eggs repeated at four-hour intervals during the day, and was regarded as satisfactorily fulfilling the following specifications: (*a*) It was sufficient to supply body needs under conditions of bed rest; (*b*) it could be tolerated in practically all acute and chronic disorders of the digestive tract; (*c*) it was standard as regards composition, amount, caloric value, and time of administration; (*d*) it was blood-free and required no further modification for the determination of gastrointestinal bleeding and parasitosis.

The morning after admission the fasting stomch was aspirated and a test breakfast administered and withdrawn. Following this, where necessary, the Roentgen examination with opaque meal was commenced and continued for twenty-four hours. As soon as acute symptoms (pain, vomiting, diarrhea, anorexia) subsided, and special tests

such as stool examinations for blood were completed, the patient was put on the "special" diet prepared by the dietitian. This was a mixed, bland regimen, suitable for the great majority of digestive disturbances. In addition to this, the further resources of the diet kitchen as regards special service were of course available.

As the patient progressed toward recovery, and whenever possible before his discharge from the hospital, he was sent to the general mess hall to eat with the other convalescents. Weight records were kept of each patient, entries being made on the charts about twice a week.

II. ANALYSIS OF CASES

Table I shows the various types of cases seen on the service arranged in the order of frequency. The nomenclature of the Manual of the Medical Department, U. S. Army, "Changes 6," has been strictly followed with the single exception of "Malfunction of gastroenterostomy." In all 736 diagnoses were made on the 733 cases admitted. Where more than one important associated condition was found each was listed, otherwise only the most prominent finding. Since no gastrointestinal disease was discovered in 19 of the men admitted, the net total of actual cases observed was 714.

Ankylostomiasis.—The large number of hookworm cases (over 53 per cent of all admissions) furnished splendid material for the study of this condition. It was while working with this group that the intraintestinal tube treatment was devised and perfected.[1] Among other interesting observations was the fact that hookworm ova could be aspirated through the duodenal tube, although this maneuver was not successful often enough to serve as a practical aid in diagnosis. On one occasion a live worm was brought up by this method. Several specimens of copulating worms were secured, but always in the vomitus, never in the bowel movements.

The results of treatment were good. The average gain in weight approximated 6 pounds per man after a month's hospitalization. One patient who was admitted with hemoglobin of 45 per cent, greatly enlarged liver and spleen, and peripheral edema, was discharged in four months practically well with a gain of 31 pounds to his credit. It must be stated, however, that most of the men were not obviously the worse for their infection and would not have been admitted for treatment if it had not been for the uncinaria surveys that were constantly being made in the hospital and the surrounding camp organiza-

[1] This experience has been the subject of two special studies by the author: "The Intraintestinal Tube Treatment of Hookworm Infection," *Journ. Amer. Med. Assn.*, 73, 1919, 1181, and "The Cure of Hookworm Infection," *Amer. Journ. Med. Sci.*, 159, 1920.

tions. Furthermore, the average degree of infection was not heavy, and many of the cases would have escaped detection by any but the most delicate and systematic methods of stool examination. Despite their being treated for a non-apparent condition, the spirit of coöperation on the part of the men themselves was satisfactory, and there were in fact several instances where non-patients asked for examination and received appropriate advice and treatment. The interest in the work was furthermore kept up by a fairly comprehensive publicity campaign suggested and actively supported by Dr. Lewis C. Ecker, while chief of the medical service, whereby the whole subject of hookworm disease and its prevention and treatment were presented to the soldier patients, nurses and medical officers, by a series of talks, demonstrations, and clinics.

Gastrointestinal Neuroses.—After eliminating those admitted for intestinal parasitosis, more than one-third of all cases were found to be suffering from one form or another of digestive neurosis. For the sake of latter-day analogy, the term "neuro-digestive-asthenia" may be invoked to describe this condition, but, as a matter of fact, these individuals have long been recognized as belonging to the large family of unstable asthenics who break down readily under the strain of life, and the designation of their disorder as "neuro-circulatory asthenia," "neuro-digestive asthenia," and "neurasthenia" (or "psychasthenia") is of value chiefly as it indicates the predominance of circulatory, digestive, or nervous symptoms.[2] It is the writer's opinion that surgeons were apt to err on the side of retaining such soldiers too long in the service. A direct history of repeated digestive break-downs with distinctly curtailed civilian efficiency in the past, and an increased frequency of upsets after induction or enlistment, precipitated by drill, by army food, by preventive inoculations, by exposure to excessive heat, by any of the orthodox stresses and strains of mind and body to which the recruit was subjected, should have been made a sufficient basis for the immediate withdrawal of such an individual from full duty. If, in addition, there was defective physical development (see below), and an inability to "come back" under the most favorable conditions of hospital observation, he should forthwith have been discharged for disability existing prior to enlistment. The writer has seen such cases sent to development battalions, as if by taking thought they could add a cubit to their stature! Not only was it illogical and unjust to do so (for the army owed these men nothing because of the very nature of their disability), but it was unscientific as well, since the reconstruc-

[2] For an excellent statement from the cardiologist's viewpoint see Boas, E. P.: "On the Nature of Neurocirculatory Asthenia," *N. Y. Medical Journal*, 110, 1919, 273.

tion of these particular soldiers in any immediate sense was hopeless and would fall more properly to those interested in eugenics or social service or other similarly comprehensive community programs.

Defective Physical Development.—There was a total of 112 cases of defective physical development in the entire series. This diagnosis (which is not listed as a separate item in Table I) was made in every individual showing unmistakable objective evidence of visceroptosis and the asthenic habitus. The increased susceptibility of such men to digestive break-downs is well brought out by the following considerations: Of the total cases observed (714) those with intestinal parasitosis (403) were, as already mentioned, virtually free from dyspeptic symptoms. In this group but 34 or 8 per cent were of the asthenic habitus. On the other hand, of the remaining 311 real dyspeptics 78 or 25 per cent had defective physiques. From this it would appear that the soldier with visceroptosis was at least three times more likely to suffer a digestive break-down than was his stockier companion.

Acute Enteritis.—This occurred mainly during the summer months. Predisposing factors were heat, fatigue, and preventive inoculations. At least two small epidemics of food (meat) poisoning[3] took place in the surrounding organizations, but few of the men were sick enough to reach the hospital. The treatment consisted of bed rest, forced fluid (milk or fruit juice) diet, and no medication.

Hyperchlorhydria.—The diagnosis "hyperchlorhydria, cause undetermined," was made whenever superacidity was the only finding available for the explanation of symptoms complained of. Many additional cases of hyperchlorhydria do not appear as such in Table I because they were associated with organic diseases which are listed instead. The distinction is of course largely arbitrary because it is acknowledged that future developments in any of the so-called functional acidity cases might throw them definitely into the group of organic visceral diseases.

Duodenal and Gastric Ulcer; Malfunction of Gastroenterostomy; the Laparotomized Soldier.—The diagnosis of ulcer was made on a consideration of the following items: (1) Long standing history; (2) persistent abdominal pain and tenderness; (3) vomiting, pylorospasm, pyloric obstruction; (4) hyperacidity, hypersecretion; (5) positive Roentgen findings; (6) hematemesis. At first, such men when relieved were returned to duty marked "Domestic Service Only." Afterwards they were directly discharged on C. D. D.

The patients on whom gastroenterostomy had been previously per-

[3] See Greenwald, I.: "The Nature of the Toxic Agent in 'Meat Poisoning,'" Amer. Journ. Pub. Health, 9, 1919, 595, for a report of the work of the Harriman Research Laboratory in this connection.

formed, presumably for ulcer, suffered either from too rapid emptying of the stomach, or, more commonly, from delayed emptying with "vicious circle." All of these were sick men and had to be discharged. The writer had begun to doubt the ability of a gastroenterostomized individual to perform any kind of military duty when, by mere chance, he came across a returned operated soldier who had been through some of the hardest kind of fighting service without the slightest digestive complaint whatever!

This brings up the general question of the lapraotomized soldier. Unfortunately no comprehensive studies of this point were made anywhere in the army as far as the writer's personal knowledge goes. A review of our own material showed that of the 714 cases admitted, 46, or over 6 per cent, had undergone laparotomies for various conditions. These men were carefully questioned as to the original indications for the intervention, and it was found that they could be divided into three groups (see Table II): (1) Those who had a clear positive indication for surgical intervention; (2) those who had no indication according to the history given; (3) those in whom the intervention was of doubtful justifiability. Of the total operated cases only nine (less than 20 per cent) were cured. The remainder were either not relieved or developed new symptoms which they attributed to the operation. Practically every one of these had to be discharged from the service sooner or later.[4]

Amebic Dysentery; Pellagra.—The fourteen cases of dysentery originated in various parts of the south or in the Philippines and reached our particular service as recurrences in every instance. There was no evidence of local hospital or camp infection. The acute exacerbations were checked with emetine intramuscularly. Further symptoms were attacked locally by quinine irrigations per rectum. No case was returned to full duty and most were dismissed from the service.

The two pellagrins were poor farmers who had been drafted into the army. Both men were infected with hookworms. The skin lesions quickly disappeared on general hospital care and a mixed diet.

Miscellaneous.—The case of malnutrition from starvation was in the person of a Porto Rican conscientious objector who was said to have refrained from all (?) food for twelve days. The family history showed that his mother and all his maternal aunts were insane or maniacal. The patient himself was a religious maniac. Otherwise he was apparently normal. In the hospital he ate all the food set before him without rebellion and gained 18 pounds in seventeen days.

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[4] For a recent expression of similar general conclusions based on extensive civilian experience, see Brown, Thos. R.: "Late Results of Supposedly Successful Abdominal Operations on the Digestive Tract," *Journ. Amer Med. Assn.*, 73, 1919, 1501.

The case of esophageal stricture followed an attempt at suicide by means of drinking a strong lye solution used for scrubbing. The patient recovered from the immediate effects, and the esophageal cicatrices were kept successfully dilated by bougies during the several weeks the patient was on our service. He was then removed to the psychiatric ward for observation and disposition. He remained free from dysphagia during the remainder of his stay in the hospital.

TABLE I.—*Diagnoses in Order of Frequency*

1. Total intestinal parasites	403	19. Cholangitis, ac. catarrhal	3
Ankylostomiasis	381	20. Hypochlorhydria, C. undet	3
Ascaris	7	21. Gases, deleter. effect of	3
Other nematodes	8	22. Gastrosuccorrhea	2
Cestodes	7	23. Pellagra	2
2. Neurosis, gastrointestinal	113	24. Hemorrhoids	2
3. Enteritis, ac. catarrhal	45	25. Gingivitis, ac. supp	2
4. Hyperchlorhydria, C. undet	31	26. "Autointoxication"	2
5. Ulcer, duodenal	24	27. Enteritis, chr. catarrhal	2
6. Observation, no G. I. disease	19	28. Adhesions, perigastric	2
7. Constipation, chr., C. undet	17	29. Pyorrhea alveolaris	1
8. Dysentery, amebic	14	30. Migraine	1
9. Achylia gastrica	11	31. Malnutrition from starvation	1
10. Appendicitis, chr. catarrhal	8	32. Exophthalmic goitre	1
11. Malfunction gastroenterostomy	8	33. Esophagus, stricture of	1
12. Gastritis, chr. catarrhal	6	34. Aneurysm, abdominal aorta	1
13. Diabetes mellitus	6	35. Angioma of tongue	1
14. Adhesions, intestinal	5	36. Vagotonia	1
15. Typhoid vaccination	5	37. Cancer of stomach	1
16. Ulcer of stomach	5	38. Intestinal obstruction	1
17. Gastritis, acute catarrhal	5	39. Stomach, hourglass contraction	1
18. Cholecystitis, chr. catarrhal	4		

Total diagnoses listed	763
Cases counted twice	30
No. G. I. disease	19
(Deducted)	49
Net total cases	714

TABLE II.—*End Results in* 46 *Previously Laparotomized Soldiers*

Indication for operation from patient's history	Results			
	No relief	New symptoms	Cured	Totals
Positive indication	6	7	6	19
No indication	2	2	0	4
Indication doubtful	15	5	3	23
Totals	23	14	9	46

Conclusion.—It is not the writer's intention to draw loose, general conclusions from the above experience. Too pessimistic an impression as to the capacity of dyspeptics to qualify as fighting men is by no means justifiable. Now that such evidence is available, more than one ex-soldier will bear witness that his dyspepsia disappeared almost completely, if only temporarily, during his period of service with the colors. There is indeed no way of telling in advance in many an instance whether the disability is such as to be benefited or aggravated by military duties. The policy pursued in the recent mobilization of assigning trained men as gastroenterologists to the various base and general hospitals is decidedly to be recommended. Such men can readily build up special services that will be properly equipped to dispose adequately of all cases showing digestive disturbance. By this means much time can be saved in the weeding out of the absolutely unfit, the distribution of the moderately disabled to restricted duties, and the cure of those suffering from transient disorders.

BLOOD TRANSFUSION

By Captain HUSSEY

BLOOD transfusion, like many modern therapeutic measures, is an old idea which has been recently developed into a practical and easily performed method. As a matter of fact an attempt was made at blood transfusion as early as the sixteenth century. During the past ten years many efforts have been directed toward improving technical methods for this procedure. These have been so successful that now it is quite possible for blood transfusion to be utilized on a broad scale.

In reviewing the many methods of blood transfusion extant for the most practicable one to be used under conditions of war in the hospitals of the zone of activity, a committee appointed by Major Finney, chief consulting surgeon for the A. E. F., gave due consideration to the many possibilities. These methods fall into two general classes, namely, the direct and indirect. In the direct methods the blood is allowed to flow from the vessel of the donor into the vessel of the recipient. This is accomplished either by bringing the endothelial lining of the vessels of the two people into apposition or connecting the vessels by means of an especially devised tube. One cannot judge the volume of blood transfused, and there are many possible misfortunes for both donor and recipient. Moreover, such procedures entail unusual surgical experience. For many obvious reasons the direct methods were considered quite out of the question, so the matter resolved itself to the consideration of the best indirect procedure. It was thought very necessary to keep in mind that, whatever method would ultimately be decided upon, it should be one simple enough to assure the possibility of a large number of men being easily and quickly trained to perform it, one that could be handled by one man, yet one which would give the best results. There are two groups of indirect methods, one in which the unmodified blood is transfused, another which utilizes some anticoagulant, thus disregarding the time element of coagulation. The unmodified blood transfusion methods are performed by the means of especially designed mechanical devices or the use of syringes. Obviously it would be impracticable to expect to supply a large enough number of any special instruments on account of the difficulties of manufacture at the present time; the syringe methods require at least two men for their performance. Furthermore, all these procedures require a certain degree of dexterity in handling them which could not be acquired as quickly as is de-

sired in the present emergency; hence any wide application of blood transfusion would be quite impossible. Obviously, then, some indirect method using modified blood had to be decided upon. Experience has shown that sodium citrate is the best anticoagulant to use for this purpose. Although there has been some controversy about the relative merits of modified and unmodified blood transfusion, the use of the citrate method has been very favorably reported upon, and in the hands of workers who have had opportunities to use both methods the results compare very equally. The citrate method was decided upon and adopted for development to be used among the troops of the American Expeditionary Forces.

AMOUNT OF SODIUM CITRATE

Regarding the amount of sodium citrate one can use it is necessary, of course, to use a sufficient quantity that will prevent coagulation and at the same time be not of quantity sufficient to be toxic. It is generally accepted that a concentration of 0.2 per cent of this salt will prevent coagulation. Different workers vary from 0.2 to 1 per cent concentration for blood transfusion. We use a solution containing a sufficient quantity of anhydrous sodium citrate to give a concentration of approximately 0.21 per cent. There are three salts of sodium citrate to be obtained from the open market, the anhydrous salt $C_6H_5O_7.Na_3$, one containing two molecules of water of hydration $C_6H_5O_7.Na_3+2H_2O$, another containing eleven molecules of water of hydration $2(C_6H_5O_7.Na_3)+11H_2O$. We make a 42 per cent solution of the salt containing 11 molecules of water of hydration; 5 c.c. of such a solution contains 2.10 grams of the salt, which amount is equivalent to 1.518 grams of an anhydrous salt. When blood is taken from an individual for transfusion it is received into a bottle containing 100 c.c. of physiological saline to which has been added the 5 c.c. of citrate solution; it is intended that 600 c.c. of blood be taken into this solution, which will bring the total volume to 700 c.c. Then in 700 c.c. of the blood-salt solution mixture we have 1.518 grams of the anhydrous sodium citrate, enough to give a concentration of approximately 0.21 per cent. If, as is sometimes the case, the full amount of blood desired is not obtained, the concentration will of course be higher, but the actual amount of salt of course will remain the same, so after all it is a question of the actual amount of salt that is given rather than just the concentration. The citrate solution is issued in glass ampules; these are prepared by first putting in the solution, then sterilizing in the autoclave of 15-pound pressure for fifteen minutes; the ampules are then sealed in the blow flame.

DONORS

A very important consideration in blood transfusion is the selection of individuals for donating blood. First of all such individuals must be free from any communicable disease, such as syphilis and malaria. Besides this there is certain biologic incompatibility of bloods of different individual members of the same species, so it is quite necessary to determine the compatibility of bloods before an attempt at transfusion is made. The serum of certain individuals contains bodies called agglutinins and hemolysins, which cause either the agglutination or hemolysis, or both, of the cells of other individuals. While these are not always consistent, hemolysins never exist without agglutinins. It has been determined by a number of different workers who have matched the bloods of several thousand different individuals that all persons fall into one or four groups: the percentage of these groups are about as follows: Group I, 5 per cent; Group II, 35 per cent; Group III, 10 per cent; Group IV, 50 per cent. A very convenient way to impress your mind with the possible incompatibilities of these different groups will be to follow this diagram. Assuming that the sera contain bodies we call agglutinins or hemolysins represented as *a* and *b*, and that the cells contain substances we call agglutinogens or hemolysinogens represented as *A* and *B*, and that similiar bodies act on similar bodies, then assuming the distribution of these bodies in the cells and sera of the members of the different groups as follows:

Group	*Cells*	*Serum*
I	*AB*	..
II	*A*	*b*
III	*B*	*a*
IV	..	*ab*

In Group I the cells have the *A* and *B* bodies, a serum which will cause agglutination or hemolysis of these cells must have either or both *a* and *b* bodies. It will be seen that all other sera save that of Group I contain such bodies, so the serum of a Group I individual is the only serum which will be compatible with the cells of such an individual; therefore the blood of Group I individual could not be used for transfusion to an individual a member of any other group. Now in Group IV you see the cells have neither *A* nor *B* bodies, so it will be impossible for these cells to be acted upon by the serum of an individual a member of any of the other groups. So the blood of an individual a member of Group IV can be used for transfusion to anybody. You will notice, however, that the serum of a Group IV individual contains both the *a* and *b* bodies, and one might think in

view of this fact that such a blood transfused to an individual whose cells contain *A* or *B*, or both, bodies that such cells would be harmed. However, the high dilution that is made as the bloods become mixed renders this fact a negligible one. It might be said, however, that there are *two kinds of incompatibility, a clinical and physiological; a clinical incompatibility* would be one where the serum of the recipient contains the bodies that will affect the cells of the donor and *must not under any circumstances be admitted. The physiological incompatibility* would be an instance where the serum of the donor may affect the cells of the recipient in a concentrated suspension, but under the conditions of administration the mechanism will not be affected. In other words the rule to remember is that *the cells of the donor must not be hemolysed by the serum of the recipient.* By applying this idea you will see that it is possible to *use the blood of anybody for a Group I* individual; for this reason such individuals are spoken of as "Universal Recipients." Also you will notice that *the blood of a Group IV* individual *may be used* for the *members of any other group;* an individual belonging to this group is called a "Universal Donor." For Group II individuals it will be possible to use the blood of the same group, or of Group IV. For a Group III individual it will be possible to use the blood of the same group, or Group IV.

There are several different methods for matching bloods to make these determinations; the one we have decided upon is a macroscopic slide method devised by Dr. Vincent of Boston. In this method the serum of a Group II and a Group III individual are utilized; they have added to them sufficient sodium citrate to give a concentration of 1.5 per cent, also phenol 0.25 per cent. In most of the methods it is necessary to have washed cells and separated serum; the citrate is added to this serum so that whole blood obtained from a prick in the ear or finger can be used and coagulation will be prevented. Although the sodium citrate will interfere with the hemolysis it will not interfere with agglutination. However, in view of the fact that hemolysins do not exist unless agglutinins do, the group determination can be made on the basis of agglutination alone. We have provided a glass slide which has the Roman numeral II in the upper left-hand corner and the Roman numeral III in the upper right-hand corner. One places a drop of each of the sera on the respective ends of the slide, then takes a small amount of fresh blood of the individual to be grouped, and intimately mixes it with the serum on one end, and then another small amount of blood likewise with the serum on the opposite end; within a few seconds on one side or the other he may notice an appearance which resembles fine brick dust;

this denotes agglutination. If this appearance occurs in the serum of Group II, we know that such cells to agglutinate must contain the *A* bodies, so the individual whose blood it was could not be a Group II individual but must be a I or III, because it would be impossible for the serum to agglutinate its own cells or the cells of a Group IV as neither of these contains the *A* body. If the cells were from a Group I individual, we should expect to find the serum of the Group III causing agglutination also, because this serum contains bodies and Group I cells contain both *A* and *B;* therefore when both sera cause agglutination the individual being tested is a member of Group I; when the serum of either II or III alone agglutinates the cells the individual belongs to the group where no change takes place. If the cells are not agglutinated by either sera, the individual belongs to Group IV.

METHOD OF TRANSFUSION

The outfit designed to carry out this work consists of two boxes containing the necessary paraphernalia for performing every technical detail of the procedure—a large box containing glassware, rubber tubing, needles, etc., and a smaller box containing the laboratory outfit for group determination, tags for identifying the individuals of the different groups, the citrate solution in ampules, solution for washing needles, and fluid for making red cell estimations. When one of these outfits is received at a hospital where it will be used, the contents of the box will be prepared for use by being separated into units, and each unit will be wrapped in unbleached muslin and sterilized as other surgical materials are prepared. When a transfusion is to be done, one of these large bottles will be unwrapped, 100 c.c. of sterile physiological saline solution will be poured into the bottle, and the contents of one of the ampules of sodium citrate solution emptied into it and mixed well.

One unit marked *donor*, consisting of a rubber stopper with two short right-angle glass tubes, one a little longer than the other, is fitted into the bottle; to the shorter of these two tubes a piece of rubber tubing is connected, and to the free end of this rubber tube a glass suction tube is connected. To the longer tube a piece of rubber tubing, about half as long as the rubber tubing just mentioned, is attached; at the free end of this tubing a needle of 25 or 20/10 mm. bore is adjusted; the apparatus is then ready for receiving the blood. The arm of the donor should be cleaned and a tourniquet placed just above the elbow just insufficiently tight to prevent arterial circulation; the veins of the forearm will now be seen to stand out

prominently. One of these is selected for puncture, the skin over it is painted with iodine, and then a vena puncture made to obtain the desired amount of blood. While the blood is flowing into the bottle one should rotate the bottle so that an intimate mixture of blood and citrate salt solution be effected. Suction through the glass tubing with the mouth will facilitate the flow of blood. The rubber stopper with the glass tubes is now removed and in its place is put the rubber stopper with two tubes from the package marked *Recipient.* One of these tubes is very much longer than the other, reaching nearly the bottom of the bottle. To the exposed end of this glass tube a long rubber tubing about a meter in length is attached, and to the free end of this tube a small piece of glass tubing is attached. To the exposed end of the short tube a piece of rubber tubing of medium length is attached, and to its free end and a small glass tube containing a pledget of cotton is fitted. A needle of about 13/10 mm. is now selected and attached to a very short piece of rubber tubing. One blows through the tube connected with the short glass tube until the blood mixture reaches the end of the glass tube attached to the long rubber tubing; a clamp is now fixed on the rubber tubing until the needle has been successfully placed in the veins of the forearm of the recipient, the forearm having been previously prepared as in the instance of the donor. The rubber tubing attached to the needle is now connected with the glass tubing of the long rubber tubing, the bottle is elevated, the clamp released, and the blood allowed to flow into the vein of the recipient after the tourniquet has been removed. One should allow from ten to thirteen minutes for this amount of blood to be received by the recipient, or a longer time if conditions seem advisable. It must be remembered that, if the blood mixture be allowed to flow too rapidly, so much fluid may be taken into the venous circulation in such a short space of time that the right heart may not be able to accommodate it; this will be followed by unfortunate results. Quite frequently, with an individual suffering from shock or hemorrhage, the blood pressure may be so low that it will be quite impossible to get distention of the veins by the use of the tourniquet; in such cases it will be necessary to cut down on the vein and use a cannula. There are two cannulae with each outfit for this purpose.

It might be thought that the needles advised for obtaining the blood from the donor are rather large, but where such a large amount of blood is to be obtained it is quite necessary to use a large needle. There will be no difficulty experienced if the needles are well cared for and kept sharpened; so frequently does one encounter a good deal

of difficulty in entering veins on account of using dull needles that we have in each outfit sharpening stones to be used by the operators so that they may have no difficulty in having their needles properly sharpened. Very frequently a needle may look perfectly well sharpened, but when it is examined with a low-power lens under the microscope one will notice it is very defective. It is, therefore, a wise procedure to resort to this before putting a needle into a tube for sterilization for future use. After each transfusion, the needle should be washed with distilled water, then 95 per cent alcohol, and finally with ether; then thoroughly dried, carefully examined, and sterilized with dry heat.

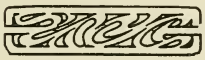
INDICATION FOR BLOOD TRANSFUSION

Blood transfusion is advised in all cases of shock and hemorrhage, whether existing alone or in combination. It is particularly desirable that the transfusion be done as early after injury as possible. The best indication for determining the necessity for transfusion is the blood pressure; in any case where the systolic blood pressure is 80 mm. or below, transfusion should be done immediately. However, in cases where there are severe abdominal injuries or other injuries to other parts of the body where bleeding may commence as soon as the blood pressure is elevated, the transfusion should not be done until the patient is on an operating table where a surgeon will be ready to control such hemorrhage with the greatest facility. Blood transfusion may be said to be only one, but perhaps the best of several methods used for the resuscitation of a wounded man suffering from shock or hemorrhage. It should be practiced as often as it is possible and should be made possible at all times.

RESUSCITATION WORK FOR THE WOUNDED OF THE AMERICAN EXPEDITIONARY FORCES

In view of the fact that blood transfusion, as well as other methods of resuscitation, will have wide application among our wounded troops, it has been thought advisable to have men especially trained for carrying out this work. Such men will be selected from the medical men; they will be sent in groups of about six to the Central Medical Department Laboratory, where they will receive a course of instruction which will familiarize them with the experimental facts which serve as a basis for the application of the various resuscitation methods and the technical procedure for carrying out such methods. Such men will be placed in evacuation hospitals and base hospitals; they will group a large number of possible donors, selected from the healthy

individuals of the enlisted personnel who will be willing to donate their blood when it is needed. A record of such men will be kept where it can be referred to at any time. When a convoy of wounded arrive at the hospital, the individuals who apparently may need blood transfusion will be placed in a ward where they can be given the special attention necessary for such cases, shock bed, etc. These individuals will be grouped, blood will then be obtained from some of the donors, and transfusion can be done at any time. It is even hoped that we may be able to have men placed in more advanced aid stations where, although blood transfusion is not practicable, other resuscitation methods are, and men who have had training and experience will have acquired a degree of physiological judgment which will enable them to save the life of many a wounded soldier who perhaps would die before reaching an evacuation hospital or would at least be in such an advanced state of circulatory collapse that this condition would be hopeless and he perhaps would die a short time after reaching the hospital.



INFLUENZA—U. S. ARMY[1]

By Colonel DEANE C. HOWARD and Major ALBERT G. LOVE
Medical Corps, United States Army

(With seven illustrations)

I

THE passing of the influenza pandemic of 1919 left in its wake a record of fatalities within a comparatively short time without precedent in the history of other pandemics or plagues, ancient or modern. The number of deaths from the disease and its complications throughout the world in 1918 has been variously estimated from six to ten millions. If the latter figure is correct, the losses from influenza in 1918 exceed by far the total battle losses of all the belligerent forces for the entire period of the World War. Unfortunately, the exact incidence of the disease and the number of resulting deaths will never be accurately known, as a tremendous toll in deaths was taken among the uncivilized races in various parts of the world where death registrations are entirely lacking. Furthermore, complete records of deaths, due directly or indirectly to influenza, will never be available from even the more highly organized communities of this country and Europe. The importance and extreme value, therefore, of accurate vital statistics for this period, as reported from a single restricted group of a population, is obvious and should serve as a sound basis for estimates as to mortality among civil populations in the absence of more reliable data.

The vital statistics of the military forces of the United States during the year 1918 give fairly accurate information as to the prevalence of influenza, pneumonia and other acute respiratory diseases, and deaths resulting therefrom, covering a military population of approximately 3,500,000 men, stationed both at home and abroad. Here, then, we have a "restricted group" for study. The military personnel, while but recently coming from civil communities, cannot be taken as fully representative of the civilian population at large, as such personnel is taken from selected age groups (18 to 45), is confined to the male sex, and is subjected to careful physical examinations to eliminate the physically and mentally unfit before being taken into the service. It is therefore a group much above the average of civil populations in physique and stamina, even as compared with the same age group in civil life. This physical superiority might be expected to lead to lower sick and death rates among military personnel than obtains in civilian populations within the same age groups, which is true with respect to most diseases.

[1] Read at the meeting of the American Public Health Association in New Orleans, La., October, 1919. Prepared in the Office of the Surgeon General, United States Army, and published by his permission.

However, with respect to the acute respiratory diseases, other factors tend to place the military man at a disadvantage as compared with his civilian brother. It has been shown that the mortality from influenza and pneumonia during the great pandemic among soldiers in camps and cantonments was probably higher than among men of military ages in adjacent civil communities. The principal cause of the higher mortality from acute respiratory diseases among soldiers, as compared with civilians, is believed to lie chiefly in the different methods of housing and messing and the greater density of population in army camps. The housing methods in army camps and cantonments lead to a degree of congestion and close physical contact of one individual with another that has no parallel in civil communities except in institutions. In cantonments, troops were housed in large numbers in single rooms, ranging from 30 to 100 men per room, which circumstance increased the liability to contact and droplet infection from the sick to the well. When a case of influenza, measles or other acute respiratory disease makes its appearance in barrcks, a larger number of men are liable to be immediately exposed, and most of the susceptible men in a barrack room are likely to develop the disease almost simultaneously after a definite period of incubation.

In civil life, on the other hand, a man usually has a room to himself, or, at most, there may be two persons to a room, and immediate contact is limited to members of the family, a relatively small group of persons. The family itself is more or less effectively isolated from other groups (families), especially when an epidemic is prevailing. If soldiers were quartered in a similar manner, a single man to a tent or room, and could be kept from close contact with large groups of their fellows at drills, mess-halls, theaters, etc., as is possible in civil life, the incidence of acute respiratory diseases among soldiers in camps and the mortality therefrom would undoubtedly be much lower than in civil communities among men of military ages. With relation to the acute respiratory diseases, including influenza, the above-mentioned conditions place the soldier in camp at a disadvantage in his environment as compared with civilians, which more than offsets the individul superiority of physique and stamina which obviously lies with the soldier.

A word of explanation as to the machinery for the collection and compilation of vital statistics in the Army will lead to a better understanding of the completeness and relative accuracy of the statistical data on influenza and penumonia which are presented in this paper. From each camp, military post, or other station in this country and abroad, wherever American troops may be serving, individual report cards of each case of disease or injury among the military personnel are sent to the

Surgeon General's Office. These cards show a variety of data, including age, race, years of service, nativity, dates of admission and discharge, with diagnosis, complications and disposition of patient upon completion of the case. The data on these cards are then transferred to punched statistical cards for subsequent tabulation by electric tabulating machines. It is possible by this means to assemble detailed information relative to the occurrence of special diseases in various sections of the country, in various seasons of the year, and among troops from the various stations. The statistics thus furnished are the final and accurate figures for sickness, injury, death and discharges for disability in the Army. They are analyzed in many ways and compiled to form the complex tables which appear in the annual reports of the Surgeon General, and which furnish an extremely valuable assemblage of data on vital statistics for comparison with similar material gathered in the armies of foreign nations.

Another source of information coming to the office of the Surgeon General is known as "Current" Statistics, as distinguished from the permanent and final statistics referred to in the preceding paragraph. Current statistics are based on weekly telegraphic reports which are received from every army station throughout the United States and similar cabled reports from the Chief Surgeon of Expeditionary Forces abroad. These reports give up-to-date information as to the strength of all commands, the number of admissions to hospitals and quarters, the number of new cases of communicable diseases, and the number of deaths, with their detailed causes, during the period covered by the report. Based upon these reports, morbidity and mortality rates are made week by week for all military stations and for the Army at large, which are then compiled and published in weekly bulletins ("Disease Conditions among Troops") and given wide distribution. Current statistics have been the only source of information on the health of the Army from day to day and week to week which was available for current administrative control of epidemics and other disease prevalence. The permanent statistics are never ready until long after the close of the calendar year to which they pertain, hence are of no immediate value for administrative purposes.

II. CURRENT STATISTICAL INFORMATION

Early in September, 1918, when influenza in virulent form was recognized in army camps and stations, a daily telegraphic report by the senior medical officer of every command was called for, giving the number of new cases of influenza and penumonia, and the number of deaths from these two diseases during the preceding twenty-four hours. The information thus obtained was not absolutely accurate, as final and correct

diagnoses often cannot be reached at once. A patient reporting sick may appear to have a certain ailment and it will be so reported, but further observations of the case will show that something entirely different is the trouble. The daily reports, however, proved of the greatest value and were sufficiently accurate for all practical purposes. It was thus possible to follow the relative progress or abatement of epidemics in various camps, which indicated the station or stations to which personnel and supplies should be sent or withdrawn, and to what places and at what times it would be safe to move healthy troops. In fact, every administrative act in connection with the management of epidemics at camps and stations was based on telegraphic reports, which kept the

TABLE I.—*Troops in United States. New cases of influenza and pneumonia, and deaths therefrom, week by week, during the last four months of* 1918 *and the first four months of* 1919.

(*From weekly telegraphic reports*)

Week ending	Strength	New cases		Deaths		
		Influenza	Pneumonia	Pneumonia	Influenza	Total
1918						
September 6	1,530,059	.....	333	40	.....	40
September 13	1,688,786	.....	332	36	.....	36
September 20	1,638,164	11,689	758	96	2	98
September 27	1,628,690	37,943	4,313	953	19	972
October 4	1,598,303	88,478	8,655	2,431	13	2,444
October 11	1,572,055	89,152	17,882	6,005	165	6,170
October 18	1,545,397	43,799	11,013	5,289	270	5,559
October 25	1,534,667	19,966	5,575	2,368	256	2,624
November 1	1,504,902	18,175	2,861	1,113	70	1,183
November 8	1,533,672	6,887	2,392	765	143	908
November 15	1,544,077	4,485	1,335	455	64	519
November 22	1,549,343	3,936	1,079	289	32	321
November 29	1,524,722	3,000	1,136	276	43	319
December 6	1,467,918	4,056	1,120	241	14	255
December 13	1,333,620	3,630	1,061	292	19	311
December 20	1,142,378	1,957	814	230	10	240
December 27	1,045,971	1,191	532	174	13	187
Total	.....	338,344	61,191	21,053	1,133	22,186
1919						
January 3	968,935	1,262	518	123	8	131
January 10	931,549	1,888	567	171	4	175
January 17	876,298	1,897	202	184	5	189
January 24	810,592	1,442	611	175	5	180
January 31	749,007	939	394	112	3	115
February 7	668,981	728	220	72	3	75
February 14	623,405	637	205	67	0	67
February 21	590,197	550	245	56	1	57
February 28	551,821	607	227	57	4	61
March 7	540,525	389	189	47	6	53
March 14	529,775	342	174	39	1	40
March 21	531,018	250	106	32	2	34
March 28	502,411	281	136	26	1	27
April 4	463,372	170	90	21	2	23
April 11	460,743	244	93	18	2	20
April 18	438,999	208	102	11	3	14
April 25	422,655	101	55	10	3	13
Total	.....	11,935	4,134	1,221	53	1,274
Grand total	.....	350,279	65,325	22,274	1,186	23,460

Surgeon General's Office as closely informed regarding disease conditions at stations throughout the United States as the health officer of a municipality is kept informed regarding health conditions in the various subdivisions of his jurisdiction. By reviewing the current statistics during the period of the influenza epidemic, it is possible to readily follow the rise and fall of the disease in the various camps throughout the United States and compare the records of one camp or station with others, and the incidence and mortality of the disease in individual camps and stations with that of troops in the United States as a whole.

In the Army, as in civil communities, the true incidence of influenza and the mortality therefrom are not fully shown by the recorded cases and deaths. This discrepancy was anticipated during the course of the great epidemic and is fully confirmed now that the final statistics are available. Probably hundreds of deaths among our troops during the period of the epidemic, reported as due to lobar- or broncho-pneumonia, without reference to influenza as an antecedent cause, were in fact due to pneumonia either complicating influenza or as a sequel to that disease. Pneumonia devleoped so early in many cases, and, in fact, was so clearly in evidence when the case was first seen by a medical officer, that it is not strange, when hundreds of new cases were admitted to sick report daily in our large camps, that the underlying cause, *i. e.*, influenza, was not always appreciated and recorded. In some camps, early in the epidemic, the diagnosis of influenza was not made unless confirmed bacteriologically, and in other hundreds of cases of "acute bronchitis" or "acute streptococcus infection of the respiratory tract," with high percentage of complicating pneumonias, were reported, when later investigation demonstrated conclusively that the disease was the same type of influenza then prevailing in other camps. To eliminate errors in diagnosis and to gain a fairer perspective relative to the actual effect of the influenza epidemic on the death rate of the Army, it is desirable to group together all reported cases and deaths from influenza, pneumonia, empyema and other acute respiratory diseases during the epidemic period, and assume that the great majority of them were the direct or indirect results of influenza.

The first authentic cases of virulent influenza of the great autumn pandemic among troops in the United States appeared on September 7, 1918, at Camp Devens, Massachusetts. The disease was not at once recognized, the fulminating character of the infection suggesting cerebrospinal meningitis. Other cases appeared on September 8, and thereafter the number of cases rapidly increased from day to day. The height of the epidemic was reached on September 20, thirteen days after the appearance of the first authentic case. By the 30th of September this one

camp had reported approximately 10,000 cases of influenza, nearly 2,000 cases of pneumonia, with 500 deaths, from a command of approximately 45,000 men. This brief description of the course of the epidemic at Camp Devens may fairly be applied to nearly all other army camps of the cantonment type which were subsequently infected. The disease extended rapidly westward and southward, other camps being attacked in the following order and on the following dates:

Camps	*Date of attack (as reported)*	*Camps*	*Date of attack (as reported)*
Upton	September 13	Meade	September 20
Lee	September 17	Grant	September 22
Dix	September 18	Taylor	September 22
Jackson	September 18	Sevier	September 23
Hoboken	September 19	Lewis	September 23
Syracuse	September 19	Sherman	September 23
Gordon	September 19	Newport News	September 23
Humphreys	September 20	Pike	September 24
Logan	September 20	Beauregard	September 25
Funston	September 20		

(Other camps at later dates.)

For troops in the United States as a whole the height of the epidemic extended over a period of about nine weeks (September 13 to November 15). For each individual camp the duration of the epidemic was about four weeks. Thus the period from September 13 to November 15, 1918, represents the period of highest mortality from influenza-pneumonia. Subsequent to November 15, influenza of a milder type continued in nearly all camps for the greater part of the winter 1918–1919, but with relatively fewer cases, fewer complications and fewer deaths than occurred during the early weeks of the epidemic. The mortality rates, week by week, subsequent to November 15 more or less approximated those obtaining during the corresponding period of 1917, when measles and measles-pneumonia were reported as the chief causes of death. Most of the pneumonias of 1918–1919 were complications of influenza. Measles and measles-pneumonia ceased to be a factor of any considerable importance in death rates in army camps in the United States during the winter of 1918–1919, as immediately upon the signing of the armistice all draft calls were cancelled and only seasoned men, more or less immune to measles, remained in camps during the winter.

In France the epidemic followed much the same course and extended over much the same period of time as in the United States. The high-water mark for deaths from influenza and pneumonia among troops in the United States was 6,160 for the week ending October 11, and in the

A. E. F., France, 1,451, for the week ending October 17, 1918. There were approximately 1,600,000 officers and men in the United States and the same number in the A. E. F., France, during the months of September, October, November and December, 1918. It is of interest to note that the disease was much less prevalent and fatal among our troops of the Expeditionary Forces than among troops in the United States. During the last four months of 1918 deaths from influenza and pneumonia numbered 22,186 in the United States and 8,842[2] in the A. E. F., France, the respective commands being of approximately equal strength. The question arises: Why should the disease have been so much more fatal in camps in the United States than among our troops abroad? These explanations suggest themselves:

(*a*) Camps in the United States were filled to overflowing with new draftees who were unaccustomed to army conditions, who were unseasoned, and who were huddled together in large groups under conditions most favorable for contact and droplet infection from man to man. Troops in the United States were therefore more susceptible to all camp diseases, including influenza, than were the more seasoned troops composing the A. E. F., in France. Furthermore, unseasoned troops when attacked by disease are less resistant to the effects of the disease than seasoned troops.

(*b*) The practice of housing men in large numbers in a single room in cantonments in the United States was conducive to high incidence of any prevailing acute respiratory disease, especially influenza and its most serious complication, pneumonia. In France, conditions were entirely different. Practically all combat divisions were in the advance zone at the time and well spread out over wide areas. Where troops were billeted, the men were separated in small groups in their billets and shelters and were able to remain more or less isolated from other groups. Further, they were living more or less in the open during active operations, and while it might be assumed that individual resistance would be greatly reduced by the fatigue and stress of battle and that such troops would be more susceptible to influenza, it appears that the wide separation of these men and their life in the open, during this period, more than offset the disadvantageous conditions of fatigue and stress under which they were living. It is commented upon by medical officers who served in France that in commands of the service of Supply, where troops were housed in barracks with a large number of men to a single room, the epidemic ran much the same course with high mortality as it did in cantonments in the United States. It was observed

[2] Final statistics charge 11,670 deaths to influenza and penumonia in the A. E. F., France, during the last four months of 1918.

that the percentage of infection and the fatalities from influenza and pneumonia in France were much greater among troops of the Service of Supply than among troops at the front. There is but one explanation that satisfactorily covers this divergence, and that is the different method of housing and the degree of dispersion of men over wide areas at the front as against the crowded barracks or restricted areas in the Service of Supply.

(*c*) Soldiers in France were of longer service and a large proportion of them had passed the preceding winter in camps in the United States. Many of them may have had influenza in a mild form earlier in their service and thus acquired a relative immunity.

It is of interest to note the effect of this epidemic on the gross death rate from disease week by week during this period.[3]

During the summer and early fall of 1918 the death rate from disease had remained exceedingly low. Between July 1 and September 21 the highest death rate from disease among troops in the United States was 3.1 (week ending July 5, 1918) and the lower rate, 2.1 (week ending July 26). In the A. E. F., France, death rates for disease were slightly higher than in the United States but still remarkably low during the months immediately preceding the outbreak of the epidemic. The effect of the epidemic on gross death rates from disease is first noticed in records for the week ending September 21, both in the United States and in France. During the following four weeks mortality rates mounted upward to unprecedented heights (206.4 in the United States and 44.7 in A. E. F., France). It will be noted that the decline in death rate from week to week following its highest point is much more gradual than was its rise.

TABLE II.—*Effect of Influenza on Gross Death Rate for Disease, September, October, November,* 1918. (*Current statistics*)

Troops in U. S.		Troops in A. E. F., France	
Week ending	Annual death rate (disease)	Week ending	Annual death rate (disease)
September 13	2.3	September 13	1.1
September 21	4.4	September 21	7.9
September 27	32.4	September 27	14.6
October 4	81.8	October 4	20.1
October 11	206.4	October 11	41.6
October 18	190.1	October 18	44.7
October 25	92.7	October 25	35.0
November 1	43.2	November 1	30.8
November 8	33.0	November 8	21.5
November 15	19.7	November 15	12.9
November 22	13.7	November 22	12.7
November 29	13.2	November 29	12.6

[3] All rates quoted in this paper are annual rates per 1,000. The annual rates (current statistics) are based upon the number of cases and deaths occurring weekly reduced to an annual basis.

The death rates from disease among troops in the United States for the last four months of the preceding year (1917) may be taken, for purposes of comparison, as a normal rate for that period of the year in estimating the number of deaths that would have occurred in the United States in 1918 if epidemic influenza had not prevalied. The number of deaths (disease only) from September 13 to November 15, 1918 (the period of the height of the epidemic), in excess of the number of deaths that would have occurred if the death rate for 1917 had prevailed can fairly be taken as representing deaths resulting from the epidemic of influenza (Table III). Even this comparison will not indicate in full measure the baleful influence of the epidemic on gross death rates from disease during this period, for the following reasons:

(*a*) In 1917, measles was epidemic in nearly all Army camps and caused considerable mortality through the incidence of secondary pneumonias. In 1918, measles epidemics were not prevailing.

(*b*) The physical conditions surrounding the troops in the United States in 1918, such as shelter, clothing, hospital facilities, weather conditions, etc., were immeasurably better than during the preceding season.

It will be noted that the peak of the curve as regards deaths from disease among troops in the United States was reached on October 11. The virulent type of influenza had spread rapidly from camp to camp, from the Atlantic seaboard to the south and west, due to the continual interchange of personnel from infected to non-infected camps. Such movements of troops at this time were recognized as dangerous and inadvisable, and prompt recommendations were made by the Medical Department that such movements be discontinued or greatly restricted, if compatible with military interests, which, of course, were at the time paramount. The War Department was unable to approve any marked restriction of movement of men from camp to camp at this time. One result of the free inter-communication of military personnel was that practically all military stations in the United States were in the throes of the epidemic at the same time.

It must be said that very little effective prevention was accomplished during this epidemic in army camps or stations. In camps where all accepted measures for the prevention of the spread of respiratory diseases were vigorously enforced, the incidence of the disease apparently was as great as in other camps where such measures were less rigidly and effectively applied. It is probable that practically all susceptible human material in infected camps suffered from an attack of the disease during the continuance of the epidemic. The records from various camps indicate that from 15 to 40 per cent of com-

TABLE III.—*Troops in United States. Approximate Strength* 1,600,000 *During Hegiht of Influenza-Pneumonia Epidemic.*
(Current statistics)

Week ending	Death rate (disease only)		Number of deaths that would have occurred from disease in 1918 if the 1917 rate had prevailed	Number of deaths actually occurring from disease in 1918	Number of deaths from disease in 1918 in excess of the number that would have occurred if 1917 death rate for disease had prevailed
	1917	1918			
Sept. 20....	1.18	4.47	37	141	104
Sept. 27....	1.18	32.49	37	1,018	981
Oct. 4....	1.2	81.82	37	2,515	2,478
Oct. 11....	1.7	206.41	51	6,240	6,189
Oct. 18....	1.9	190.19	56	5,649	5,593
Oct. 25....	2.08	92.71	61	2,737	2,676
Nov. 1....	2.1	43.15	61	1,249	1,188
Nov. 8....	4.1	33.05	121	975	854
Nov. 15....	5.1	19.76	151	587	436
Total.....	.....	.....	612	21,111	20,499*

* This total represents the number of deaths from disease during the height of the influenza-pneumonia epidemic which may be considered properly chargeable to the effects of influenza during this period.

mands suffered from an attack of the disease. These records, as previously stated, do not indicate in full the true incidence of the disease. Certain good results were accomplished in some camps by the application of effective and early isolation of patients and suspects and other measures generally recognized as of value. It was sometimes possible to retard the progress of the epidemic and cause it to be spread over a longer period of time. The epidemic thus became less explosive in character, and fewer people were under treatment at the same time. It was possible to take better care of the sick and thus reduce the incidence of and deaths from complicating pneumonia. It has not been shown that such measures accomplished reduction in the absolute number of cases of influenza occurring in one command as compared with another.

The "cantonment" group of camps gave a much higher death rate from influenza and its complications than the "tent" camp or "departmental" group (see chart). At first glance it would appear that the different housing conditions and the more marked overcrowding in cantonments at the time would fully account for this divergence. Closer study, however, leads to the conclusion that geographical location was a factor of equal or greater importance. It is well known that the disease was most virulent and fatal in the northern, eastern and middle west states, a district in which cantonments predominated. In the southern and Pacific coast states, where the most of the tent camps were located, a milder type of the disease prevailed, with fewer resultant fatalities. Camp Lewis, Washington, and Camp Gordon, Georgia (both cantonments), had relatively low death rates, approximating those of nearby tent camps. On the other hand, Camp Syracuse, New York, and Camp Colt, Pennsylvania (both tent camps), suffered severely

and reported death rates approximating those of cantonments in the same geographical district.

III. PERMANENT STATISTICAL INFORMATION

(*a*) *Historical.*—Before considering in detail the statistics for these diseases for the year 1918, it is of interest to review briefly the history

TABLE IV.—*Influenza, Pneumonia and Common Respiratory Diseases** (1862–1918 *Inclusive*)

DEATHS ENLISTED MEN—AMERICAN TROOPS (EXCLUDING NATIVE TROOPS AND OFFICERS)

Ratios per 1,000

Year	Common resp. dis., ratio	Influenza, ratio	Pneumonia, ratio	Total resp. dis., ratio	All diseases ratio	Mean strength (annual)
1862	0.92	0.03	7.45	8.40	49.33	288,919
1863	1.06	0.03	7.23	8.32	63.21	655,955
1864	1.27	0.02	8.99	10.28	58.63	721,420
1865	1.17	0.00	8.00	9.17	66.63	734,649
1866	0.78	.....	4.26	5.04	60.58	158,514
1867	0.38	.....	1.82	2.20	48.32	47,233
1868	0.36	.....	1.31	1.66	11.65	47,472
1869	0.26	.....	0.68	0.94	9.00	35,221
1870	0.25	.....	1.38	1.63	12.02	31,831
1871	0.14	.....	1.26	1.39	10.30	29,430
1872	0.26	.....	1.34	1.60	10.13	26,844
1873	0.39	0.04	1.18	1.61	10.23	27,909
1874	0.22	.....	0.81	1.04	7.51	27,021
1875	0.13	.....	1.02	1.15	8.25	23,525
1876	0.04	.....	1.05	1.09	6.96	24,866
1877	0.34	.....	0.89	1.22	7.26	23,707
1878	0.26	.....	0.64	0.90	7.48	23,381
1879	0.17	.....	0.75	0.92	5.68	23,964
1880	0.08	.....	1.33	1.42	6.04	24,002
1881	0.34	.....	0.78	1.12	7.19	23,222
1882	0.17	.....	0.90	1.08	7.01	23,239
1883	0.09	.....	0.68	0.77	8.23	23,439
1884	0.21	.....	0.87	1.08	7.45	23,034
1885	0.11	.....	0.64	0.75	4.33	26,542
1886	0.15	.....	0.61	0.77	5.75	26,095
1887	0.04	.....	0.99	1.02	5.65	26,365
1888	0.07	.....	1.42	1.50	6.10	26,739
1889	0.04	.....	0.70	0.74	3.97	27,206
1890	0.07	0.22	0.52	0.82	5.25	26,684
1891	0.08	0.83	0.76	1.66	5.03	26,460
1892	0.11	0.22	0.63	0.97	4.36	26,861
1893	0.04	0.11	0.65	0.80	4.01	27,659
1894	.....	0.07	0.65	0.72	4.16	27,664
1895	0.07	0.16	0.48	0.71	3.85	25,204
1896	0.04	0.08	0.36	0.48	4.14	25,119
1897	.....	0.07	0.24	0.31	3.38	25,417
1898	0.06	.....	0.92	0.98	24.97	147,795
1899	0.04	0.05	0.94	1.02	11.76	105,546
1900	0.07	0.01	0.40	0.48	15.79	100,389
1901	0.01	0.01	0.57	0.59	9.58	92,491
1902	0.07	.....	0.58	0.66	12.15	80,778
1903	0.06	.....	0.43	0.49	5.33	67,643
1904	0.03	.....	0.73	0.77	3.87	58,740
1905	0.02	0.02	0.35	0.39	3.52	56,901
1906	0.01	0.01	0.28	0.32	3.28	56,443
1907	0.07	0.02	0.46	0.56	3.44	53,803
1908	0.03	0.02	0.40	0.44	3.48	65,406
1909	0.05	0.01	0.34	0.40	3.02	74,319
1910	0.03	.....	0.36	0.39	2.44	71,534
1911	0.04	.....	0.36	0.40	2.66	72,743
1912	0.03	.....	0.22	0.24	2.37	78,267
1913	0.05	.....	0.32	0.37	2.57	80,766
1914	0.01	.....	0.21	0.23	2.36	87,228
1915	0.03	0.04	0.38	0.45	2.60	93,262
1916	0.01	0.01	0.36	0.38	2.60	99,186
1917	0.06	0.02	1.63	1.71	5.09	639,645
1918	0.61	9.41	6.44	16.46	19.37	2,379,555

* Common Respiratory Diseases: Pleurisy, laryngitis, bronchitis, tonsillitis, naso-pharyngitis and pharyngitis.

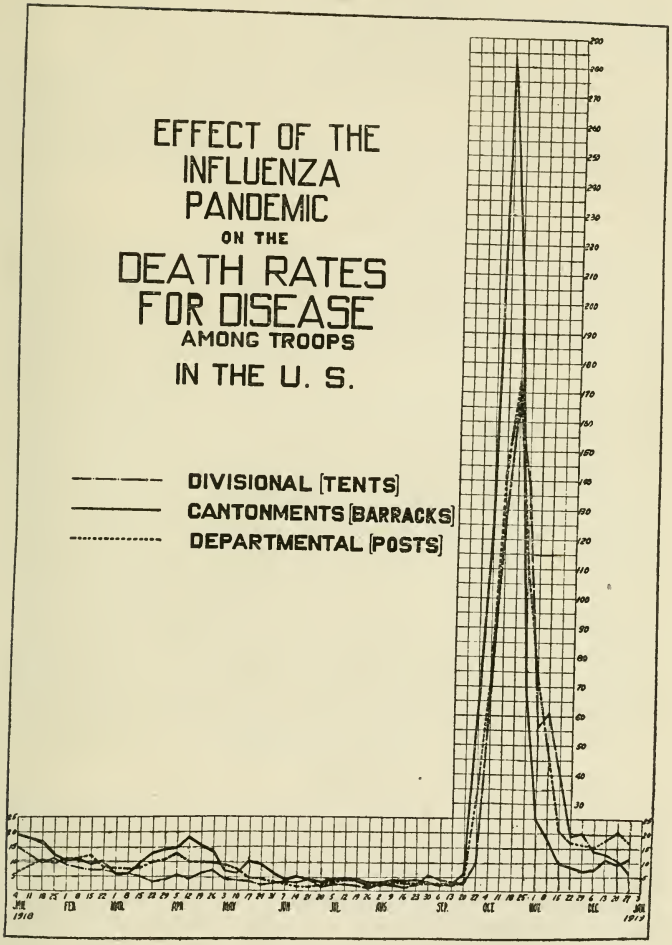

EFFECT OF THE
INFLUENZA
PANDEMIC
ON THE
DEATH RATES
FOR DISEASE
AMONG TROOPS
IN THE U. S.
DIVISIONAL (TENTS)
CANTONMENTS (BARRACKS)
DEPARTMENTAL (POSTS)

Chart 1.

of influenza, pneumonia and common types of acute respiratory diseases in the Army in previous years. Table IV shows the rates per 1,000 men for deaths, 1862 to 1918 inclusive, for influenza, pneumonias and the common types of respiratory diseases separately and combined.

Influenza, or "epidemic catarrh" (as it was then called), was reported each year from 1862 until the present time. No deaths were attributed to the disease from 1865 until the year 1890, with the exception of one case in 1873. Between 1890 and the present time there were a number

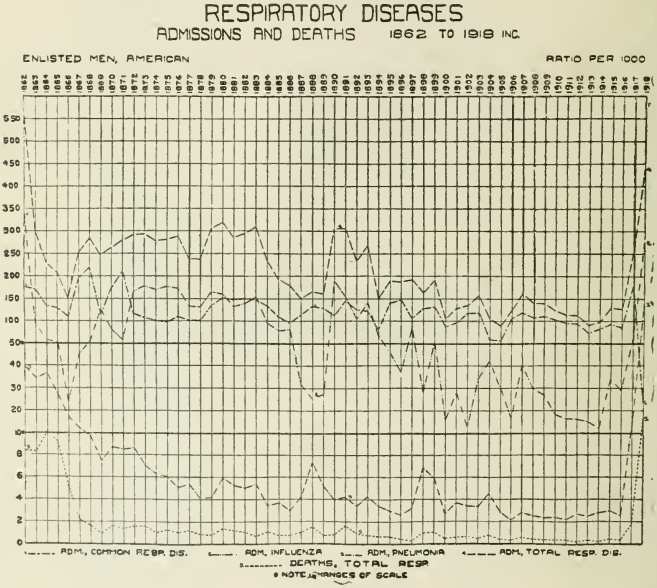


Chart 2.

of years when no deaths were charged to this disease. In 1888, a marked rised occurred in the death rate from pneumonia. In the two years immediately preceding the historic influenza epidemic of 1889–1890 there was an increase in the admission rates for acute respiratory diseases, including pneumonia, but a decrease in the admission rate for influenza. It was in 1890 that the epidemic of influenza of that period was first recognized in the Army. As a result the admission rate for influenza increased from 27.63 per 1,000 for the preceding year to 189.44 for 1890. The death rate for respiratory diseases showed only

a slight increase over that of the preceding year, being 0.82 per 1,000 as compared with 0.74. In 1891, the death rate from acute respiratory diseases was 1.66, the rate of 0.76 being charged to primary pneumonia and 0.83 to influenza. After 1891 both the death and admission rates for respiratory diseases steadily declined.

We find recorded in the annual report of 1891 in a discussion of the sickness for the year 1890 that—

> the epidemic of this disease, the so-called grippe, was developed in Boston and New York during the last week of December, 1889, and thence it spread with few exceptions to our military stations during the course of January and February, 1890. The epidemic reached its height at a given place on an average of twelve days from its invasion and lasted about 30 days. During the visitation from 5 to 90 per cent, average about 33 per cent, of each affected command suffered, but it prevailed as extensively among the camp attaches and in the neighboring civilian settlements as at the posts. At a few of the stations the medical officers did not recognize the presence of this disease. At some of these stations the medical officer is positive in his assertion that no epidemic of influenza was felt. Nevertheless, it is possible that the disease may have visited some of the posts mentioned without leaving its mark upon the records.

Among the theories relative to the spread of the disease appear the following, which is as true today as applied to the spread of the recent pandemic as it was in 1890 and 1891:

> The disease traveled westward notwithstanding a west wind and its invasion was later in the season in proportion to the length of stage travel to reach the post. The more distant posts escaped the epidemic entirely. An epidemic wave was wholly inconsistent with the facts and the propagation could be explained only on the assumption of a personal contagion carried from place to place by rail or other means of personal transportation.

During the Spanish-American War there was some increase in the death rate for acute respiratory diseases. In 1898 it was 0.98, as compared with 0.31 for the preceding year. In 1899 it was 1.02, and in 1900 it showed a marked decline to 0.48. From this time on the admission and death rates for acute respiratory diseases showed a tendency to decline, with some slight fluctuations, from year to year.

In 1917, the death rate for the acute respiratory diseases (influenza, pneumonias and the common types) increased to 1.71. During the fall of 1917, after the camps were filled with drafted men, acute epidemic diseases swept through a number of them. Measles was one of the most prevalent and one of the most fatal of the infectious diseases that occurred. It was noted during the fall and early winter that there were a number of cases of pneumonia which were unlike the pneumonia that ordinarily occurred. This was apparent both to the physicians in civil life and in the army camps. It was reported by all classes of practitioners that numerous cases of pneumonia were occurring which

resembled the pneumonia following measles, but occurring among men who had not had measles recently. In a number of the camps, both in the north and in the south, rather extensive epidemics of pneumonia occurred and a number of deaths resulted. The same variety of pneumonia occurred in the late winter and spring of 1918. In many of the camps pneumonia was practically epidemic during March and April. In many camps a number of cases occurred later in the spring and summer. It was again reported by a number of medical men that these cases of pneumonia that were occurring were different from the types of pneumonia ordinarily encountered and very similar to pneumonia following measles, but, again, that the cases occurred among men who had not had measles recently.

During 1917, a large number of cases of influenza had been reported in the United States Army, approximately 40,512. However, it was not apparent at that time that influenza might be present in a fatal epidemic form. Consequently no separate tabulations by camps by months were made for the annual report. It was again observed in the reports received from the camps during the early part of 1918, and especially for the months of January, March and April, that there were many cases of influenza being reported as well as many fatal cases of pneumonia. Few of the influenza cases during the early part of 1918, and practically none during the latter part of 1917, were reported as associated with pneumonia. It was not until later in the year, when it was recognized that the fatal epidemic form of influenza was present, that pneumonia was reported as a frequent and fatal complication.

It appears probable that unrecognized influenza may have been the primary and underlying cause of much of the fatal pneumonia which occurred in army camps late in 1917 and during the early months of 1918.

(*b*) *Influenza in* 1918.[4]—It is a disputed question whether the epidemic appearing in our camps in September, 1918, was due to a fresh importation from abroad of a virulent type of disease, or to the continuance of mild influenza of the early spring of 1918, which, from some undetermined cause, had suddenly acquired increased virulence. Good arguments are advanced on both sides of the question. No purpose will be served by attempting discussion of this disputed point in this paper. Whatever its origin, the appearance of influenza of virulent type among our troops was not unexpected, in view of the widespread distribution of the disease in Europe and elsewhere during the preceding months and the history of former pandemics of this disease.

[4] In the various charts and tables prepared from the "permanent" statistics, all deaths are charged to the month in which the disease occurred. Rates for Camp Mills are unreliable. It was an embarkation camp.

DEATHS

INFLUENZA, PRIMARY PNEUMONIA & COMMON RESPIRATORY DISEASES

LARGE CAMPS

LAST QUARTER 1917 AND THREE PERIODS 1918

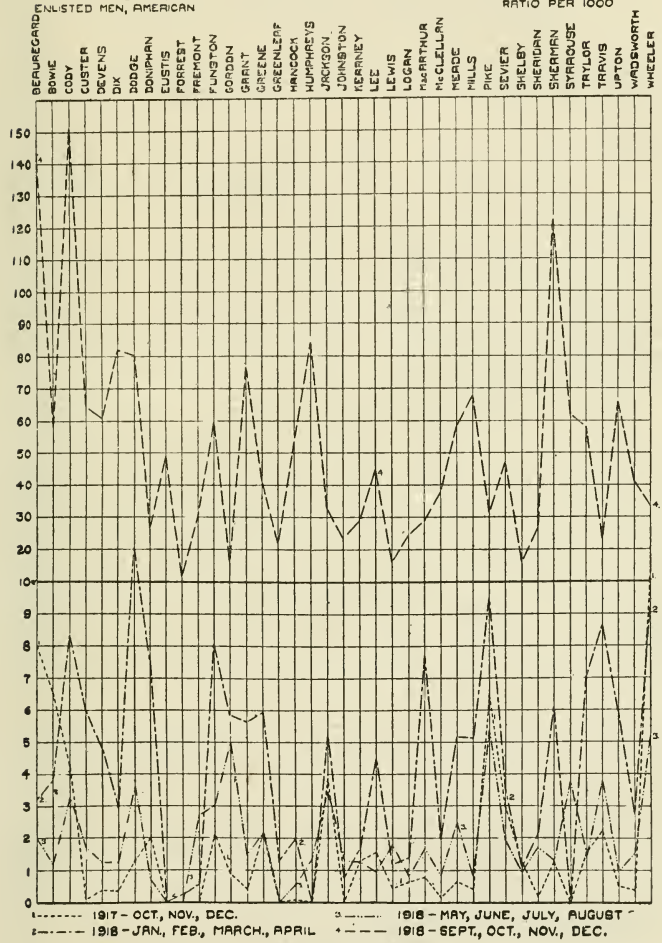


Chart 3.

The permanent statistics of influenza, pneumonia and other acute respiratory diseases for the calendar year 1918 are now available. The statistical data referred to earlier in this text were based on information contained in telegraphic reports, which are recognized as incomplete and subject to correction. Wherever discrepancies are apparent between "current" and "permanent" statistics, the latter always take precedence. In current statistics influenza was not reported as a separate disease until the outbreak in September, 1918, while the final and permanent statistics give the complete record of influenza and other acute respiratory diseases covering all American troops at home and abroad for the entire calendar year. Table V shows for pneumonias, influenza and the common types of acute respiratory diseases the monthly admission and death rates per 1,000 for troops in the United States and in Europe.

Influenza was the leading cause of admission in every country where troops of the United States were serving during the year. There was charged to influenza the total of 688,869 admissions for the entire Army during the year. The admission rate was 273.52. In addition, it is certain that many of the ordinary acute respiratory diseases should have been charged to influenza.

There were 23,007 deaths attributed to influenza for the year, giving a rate of 9.14. In addition to this number of deaths, there were 431 charged to bronchitis, 6,814 to broncho-pneumonia, 8,407 to lobar-pneumonia, 450 to pneumonia unclassified, and 262 to pleurisy. If these deaths were added to the total deaths from influenza the number would be 39,371, giving a rate of 15.64 per 1,000 for the acute respiratory diseases out of the total disease death rate of 18.81 for the year. In the pre-war period (1915) the percentage of deaths from this group of infections was something under 18 per cent of the total from all diseases. If in 1918 the death rate for these acute respiratory diseases is deducted from the total rate for the Army for the year, it leaves the exceedingly low rate of 3.18 for the year for all other diseases.

The influenza death rate for enlisted men, American troops, was highest in the United States (12.02); second in Europe (6.07); third in Panama (1.09); fourth in Hawaii (0.55); fifth in the Philippine Islands (0.14). By race it was highest for the colored troops (12.69); second for the white (8.83); third for Porto Ricans (7.80); fourth for the Filipinos (2.84); and fifth for the Hawaiians (1.72). While the native troops had higher admission rates than the whites, the death rates were lower, which again illustrates the point that the death rate for this type of disease is lower in the summer and in the tropics.

The combined death rate for broncho-and lobar-pneumonia (not a

TABLE V.—*Influenza, Pneumonia, Common Respiratory Diseases and Total for the Three Groups Admissions and Deaths by Months, Enlisted Men Only.*
Rates per 1,000

Date	United States				Europe			
	Admissions							
	Influenza (all)	Primary pneumonia (all)	Other resp.†	Total resp.	Influenza (all)	Primary pneumonia (all)	Other resp.†	Total resp.
1917								
Oct.*	31.78	12.18	.....	.....	.....	.....	.....	.....
Nov.*	82.92	31.42	.....	.....	.....	.....	.....	.....
Dec.*	139.31	36.11	.....	.....	.....	.....	.....	.....
1918								
Jan.	145.19	37.98	388.71	571.88	160.50	33.46	268.50	462.46
Feb.	100.65	22.58	252.00	375.23	84.13	15.20	141.61	240.94
Mar.	226.75	26.39	279.71	532.85	95.29	25.32	142.06	262.67
Apr.	362.91	25.81	235.90	624.62	94.30	15.60	106.43	216.33
May	103.84	14.21	141.37	259.42	128.96	11.56	74.10	214.62
June	41.72	7.41	88.16	137.29	134.37	7.92	44.46	186.75
July	34.11	7.60	88.05	129.76	60.29	6.39	29.55	96.23
Aug.	38.95	11.11	98.10	148.16	61.87	6.37	27.14	95.38
Sept.	646.00	37.30	180.64	863.94	234.26	27.33	44.22	305.81
Oct.	1,774.50	80.82	176.64	2,031.96	344.85	50.45	61.87	457.17
Nov.	191.16	19.73	189.10	399.99	164.26	16.29	65.52	246.07
Dec.	147.46	18.01	247.45	412.92	146.45	16.31	92.04	254.80
Total, 1918	361.21	26.27	190.03	577.51	167.19	20.46	65.44	253.09
	Deaths							
1917								
Oct.*	.....	.94	.....	.....	.....	.....	.....	.....
Nov.*	.....	4.56	.....	.....	.....	.....	.....	.....
Dec.*	.....	6.77	.....	.....	.....	.....	.....	.....
1918								
Jan.	.20	6.09	.06	6.35	.30	5.53	.48	6.31
Feb.	.07	2.76	.01	2.84	.....	2.01	.26	2.27
Mar.	.37	5.88	.05	6.30	.12	3.26	.20	3.58
Apr.	.48	5.54	.03	6.05	.21	1.41	.12	1.74
May	.21	2.35	.06	2.62	.28	1.23	.20	1.71
June	.14	.99	.03	1.07	.30	1.23	.12	1.65
July	.32	.97	.03	1.32	.28	.95	.06	1.29
Aug.	.45	1.79	.02	2.26	.93	1.57	.10	2.60
Sept.	39.55	12.86	1.26	53.67	13.57	11.23	.75	25.55
Oct.	70.03	25.15	.22	95.40	20.87	22.57	.83	44.32
Nov.	6.34	2.90	.21	9.45	3.97	3.56	.53	8.06
Dec.	4.08	2.38	.31	6.77	2.53	2.65	.40	5.58
Total, 1918	12.02	6.31	.20	18.53	6.07	6.46	.43	12.96

* Rates for large camps only.

† Including acute bronchitis, pharyngitis, tonsillitis, laryngitis, naso-pharyngitis and pleurisy reported as primary.

NOTE.—All deaths charged to months in which the disease occurred.

complication or sequela of other diseases) for officers was 2.41; for enlisted men, American Troops, 6.25; and for native troops, 3.68. In the United States, for enlisted men, it was 6.28; in Europe 6.08, and it was low in the tropics. For the white troops the death rate for these two pneumonias was 4.89, and for the colored, 15.81. The total number of pneumonia cases occurring among the white troops in the United States and Europe,

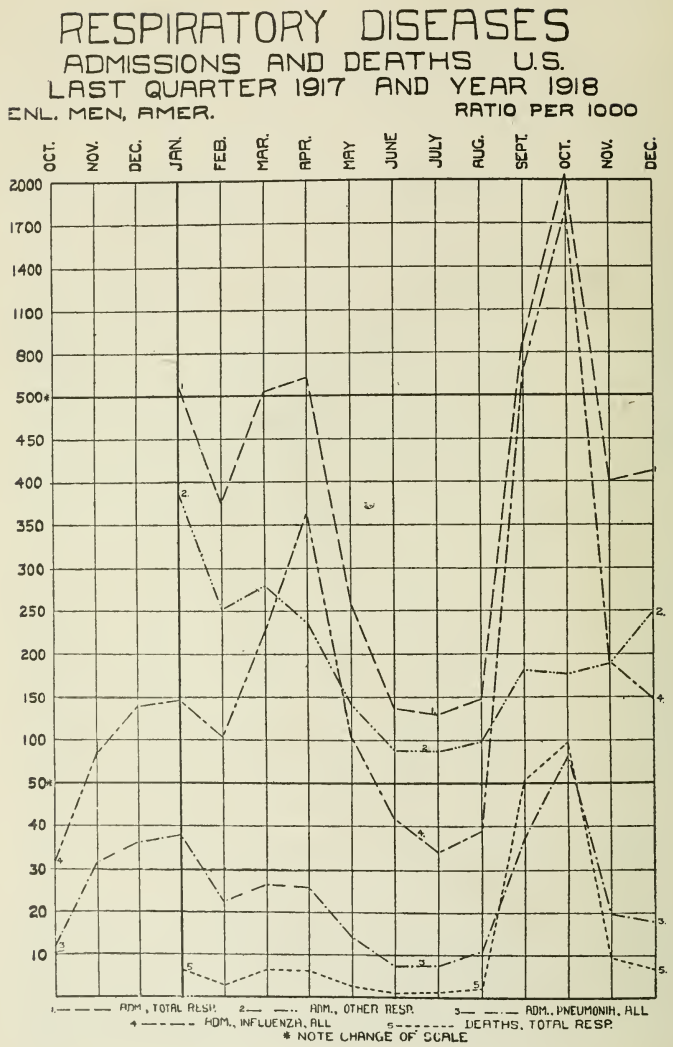

RESPIRATORY DISEASES
ADMISSIONS AND DEATHS U.S.
LAST QUARTER 1917 AND YEAR 1918
ENL. MEN, AMER.
RATIO PER 1000
OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
2000
1700
1400
1100
800
500*
450
400
350
300
250
200
150
100
50*
40
30
20
10
1.— — — ADM., TOTAL RESP.
2.— — .. ADM., OTHER RESP.
3.— — .— ADM., PNEUMONIA, ALL
4.— — — — ADM., INFLUENZA, ALL
5.— — — — DEATHS, TOTAL RESP.
* NOTE CHANGE OF SCALE

Chart 4.

RESPIRATORY DISEASES
ADMISSIONS AND DEATHS
EUROPE 1918
ENL. MEN, AMER.
RATIO PER 1000
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
450
400
350
300
250
200*
175
150
125
100
75
50*
40
30
20
10
1.— — — ADM., TOTAL RESP.
2.—·—·— ADM., OTHER RESP.
3.—·—·— ADM., INFLUENZA, ALL
4.—·—·— ADM., PNEUMONIA, ALL
5.------- DEATHS TOTAL RESP.
* NOTE CHANGE OF SCALE
*9.46.46

Chart 5.

counting the cases complicating measles and influenza, was 94,505 with 28,969 deaths. Among the colored troops, enlisted men, there were 19,319 cases, with 4,720 deaths. The incidence rate for the white troops was 44.11 and, for the colored, 115.28. The death rate for the white was 13.52, and, for the colored, 28.17. The case mortality for primary and secondary pneumonia for the white was 30.6 per cent and for the colored 24.4 per cent; for primary pneumonia for the whites it was 26.4 and for the colored 21.6 per cent. It is apparent, then, that the colored race has an incidence rate nearly three times as high as that for the white, a death rate nearly twice as high, but a case mortality rate about 20 per cent lower for all pneumonia, both primary and secondary.

TABLE VI.—*Influenza (All) with Principal Complications, United States and Europe Combined Admissions,* Deaths* and Case Mortality,* 1918. *White and Colored, Enlisted Men Only, Absolute Numbers.*

(Ratios per 1,000 and Percentage)

ADMISSIONS

	White, 2,142,336		Colored, 167,586		Color not stated, no strength		Average annual, 2,309,922	
	No.	Ratio	No.	Ratio	No.	Ratio	No.	Ratio
Influenza uncomp.	494,947	231.03	40,918	244.16	19,007	.....	554,872	240.21
Influenza and broncho-pneumonia	37,820	17.65	4,006	23.91	204	.....	42,030	18.20
Influenza and lobar-pneu.	15,205	7.10	2,659	15.87	251	.....	18,115	7.84
Influenza and others	22,644	10.57	2,381	14.21	375	.....	25,400	11.00
Grand total	570,616	266.35	49,964	298.14	19,837	.....	640,417	277.25

DEATHS

Influenza uncomp.	563	.27	69	.41	321	.....	958	.41
Influenza and broncho-pneumonia	11,736	5.48	1,253	7.48	110	.....	13,099	5.67
Influenza and lobar-pneu.	5,967	2.79	725	4.33	204	.....	6,896	2.99
Influenza and others	732	.34	94	.56	42	.....	868	.38
Grand total	19,003	8.87	2,141	12.78	677	.....	21,821	9.45

CASE MORTALITY (percentage obtained by dividing deaths by admissions)

Influenza uncomp.	.....	.11	.....	.17	.....	1.69	.....	.17
Influenza and broncho-pneumonia	.....	31.03	.....	31.23	.....	53.92	.....	31.16
Influenza and lobar-pneu.	.....	39.24	.....	27.26	.....	81.27	.....	38.07
Influenza and others	.....	3.23	.....	3.95	.....	11.20	.....	3.42
Grand total	.....	3.33	.....	4.29	.....	3.41	.....	3.41

* In the United States where the strength for the white and colored was obtained, the admission rate for the white troops was 361.43 and for the colored 354.07. The death rate for the white troops was 11.73 and for the colored 15.19. In Europe, where the strength was estimated, the admission rate for white troops was 143.91 and for the colored 206.12. The death rate for the white troops was 5.18 and for the colored 8.58.

TABLE VII.—*Pneumonia (All) Primary and Secondary, United States and Europe Combined. Admissions, Deaths and Case Mortality,* 1918. *White and Colored Troops, Enlisted Men Only. Absolute Numbers.*

(Ratios per 1,000 and percentage.)

ADMISSIONS

	White, 2,142,336		Colored, 167,586		Color not stated, no strength		Average annual, 2,309,922	
	No.	Ratio	No.	Ratio	No.	Ratio	No.	Ratio
Broncho-pneumonia and unc.-pneumonia:								
Primary	13,157	8.47	3,654	21.81	1,696	.....	23,507	10.18
With influenza	37,820	17.65	4,006	23.91	204	.....	42,030	18.20
With measles	1,268	.59	158	.94	13	.....	1,439	.62
Total	57,245	26.72	7,818	46.66	1,913	.....	66,976	29.00
Lobar-pneumonia:								
Primary	21,714	10.14	8,789	52.45	843	.....	31,346	13.57
With influenza	15,205	7.10	2,659	15.87	251	.....	18,115	7.84
With measles	341	.16	53	.32	4	.....	398	.17
Total	37,260	17.39	11,501	68.64	1,098	.....	49,859	21.58
Grand total	94,505	44.11	19,319	115.28	3,011	.....	116,835	50.58

DEATHS

Broncho-pneumonia and unc.-pneumonia:								
Primary	5,036	2.35	859	5.13	1,046	.....	6,941	3.01
With influenza	11,736	5.48	1,253	7.48	110	.....	13,099	5.67
With measles	572	.27	43	.26	11	.....	626	.27
Total	17,344	8.10	2,155	12.86	1,167	.....	20,666	8.95
Lobar-pneumonia:								
Primary	5,497	2.57	1,824	10.89	479	.....	7,800	3.38
With influenza	5,967	2.79	725	4.33	204	.....	6,896	2.99
With measles	161	.08	16	.10	2	.....	179	.08
Total	11,625	5.43	2,565	15.31	685	.....	14,875	6.44
Grand total	28,969	13.52	4,720	28.17	1,852	.....	35,541	15.39

CASE MORTALITY (percentage obtained by dividing deaths by admissions)

Broncho-pneumonia and unc.-pneumonia:								
Primary	.....	27.74	.....	23.51	.....	61.67	.....	29.53
With influenza	.....	31.03	.....	31.28	.....	53.92	.....	31.16
With measles	.....	45.11	.....	27.22	.....	84.62	.....	43.50
Total	.....	30.30	.....	27.56	.....	61.00	.....	30.86
Lobar-pneumonia:								
Primary	.....	25.32	.....	20.75	.....	56.82	.....	24.88
With influenza	.....	39.24	.....	27.26	.....	81.27	.....	38.07
With measles	.....	47.21	.....	30.19	.....	50.00	.....	44.97
Total	.....	31.20	.....	22.30	.....	62.38	.....	29.83
Grand total	.....	30.65	.....	24.43	.....	61.51	.....	30.42

The nativity rates for influenza, pneumonia and the common types of acute respiratory diseases show that it is the rural states, especially of the south, that stand at the head of the list, and that the states of the

INFLUENZA AND PNEUMONIAS 1918.

WHITE AND COLORED U.S. AND EUROPE

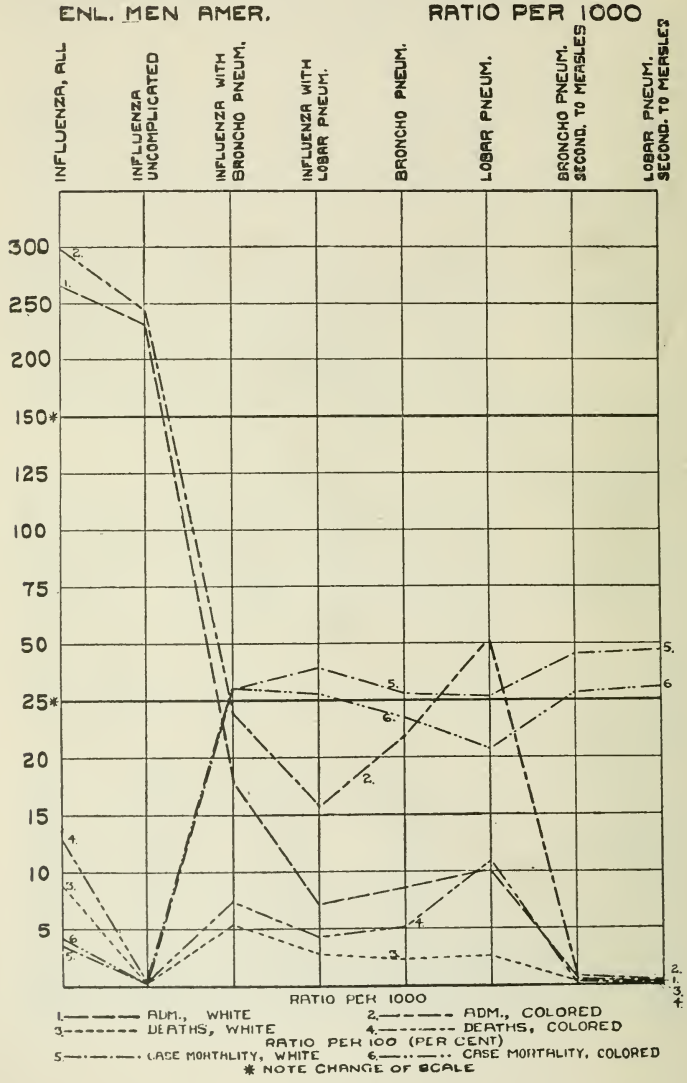


Chart 6.

north and northwest, whose soldiers seemed to be least susceptible to these diseases, stand at the bottom of the list for uncomplicated influenza and influenza with the two pneumonias. The eastern states stand next above the states of the west and northwest, with the states of the middle west in middle position.

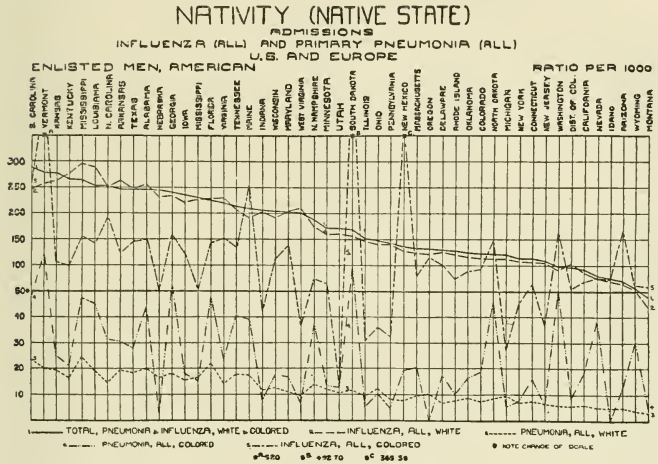


Chart 7.

Considering only the southern states, the nativity rate for influenza for the white was 247.11 and, for the colored 154.58. For lobar-pneumonia it was 10.77 for the white and 28.31 for the colored; for bronchopneumonia and unclassified pneumonia 7.26 for the whites and 11.43 for the colored. It seems probable that the negro is less susceptible to influenza than the southern whites, but that he is much more susceptible to pneumonic infections, either primary or secondary. The case mortality for influenza and its complications in the United States and Europe in 1918 for the colored was 4.3; for the white, 3.3. The apparent reason for the higher case mortality for influenza for the colored as compared with the whites is probably to be attributed to the fact that secondary pneumonia developed in a much larger percentage of the cases for the colored.

TABLE VIII.—*Nativity (Native State) Admission Rates for Primary Pneumonia (All) Influenza (All) with the Total for Both White and Colored. Enlisted Men American Troops, United States and Europe,* 1918.

Ratio per 1,000

States	Total pneu. (primary) and influenza (all), white and colored ratio	White		Colored	
		Influenza (all), ratio	Pneumonia (all), ratio	Influenza (all), ratio	Pneumonia (all), ratio
South Carolina	288.32	247.04	23.69	259.08	47.52
Vermont	278.17	257.23	20.02	520.00	120.00
Kansas	277.21	263.21	19.40	107.03	25.02
Kentucky	265.65	276.66	16.43	99.15	21.33
Mississippi	264.74	295.89	24.44	153.67	47.42
Louisiana	253.36	289.23	19.11	142.67	45.27
North Carolina	253.35	252.15	14.69	189.55	31.70
Arkansas	246.05	264.07	19.41	124.46	30.78
Texas	245.79	246.62	18.41	143.59	28.09
Alabama	245.19	257.06	19.99	148.95	43.95
Nebraska	244.63	239.91	16.48	56.83	3.08
Georgia	241.02	233.99	18.16	158.38	60.81
Iowa	235.24	220.81	15.49	124.15	18.02
Missouri	230.24	227.06	16.50	53.88	15.28
Florida	225.09	228.29	22.03	141.35	47.80
Virginia	220.06	229.87	14.22	151.07	23.69
Tennessee	213.67	207.89	17.93	135.76	40.64
Maine	209.27	191.61	17.47	254.91	39.22
Indiana	206.28	202.49	11.76	43.05	7.75
Wisconsin	204.22	191.93	12.43	114.54	17.62
Maryland	202.75	204.85	10.99	137.45	16.79
West Virginia	201.49	210.73	9.46	36.58	6.32
New Hampshire	188.57	174.87	13.84	74.07	37.04
Utah	171.44	161.62	10.53	12.82	12.82
Minnesota	171.58	160.04	12.06	65.51	13.49
South Dakota	169.14	156.61	11.60	492.07	95.24
Illinois	151.81	146.77	9.50	30.84	5.06
Ohio	148.38	140.60	12.31	36.11	10.15
Pennsylvania	142.92	140.90	8.24	32.65	4.93
New Mexico	136.45	127.70	7.70	365.38	19.23
Massachusetts	132.82	123.53	9.64	79.72	20.56
Oregon	132.29	122.10	10.22	115.94	.....
Delaware	129.93	125.83	6.77	101.81	17.32
Rhode Island	128.27	121.11	7.96	74.58	10.17
Oklahoma	124.52	117.14	8.85	89.11	16.96
Colorado	122.56	114.84	7.53	93.17	18.64
North Dakota	122.16	113.38	8.52	147.74	45.46
Michigan	120.58	112.70	9.56	27.16	5.35
New York	113.95	108.14	6.96	45.18	7.48
Connecticut	113.93	107.07	7.51	64.91	15.71
New Jersey	108.44	105.25	6.57	37.08	6.28
Washington	98.09	91.60	5.91	164.77	51.13
District of Columbia	97.28	104.66	5.70	56.15	8.87
California	92.63	86.64	6.02	69.73	18.24
Nevada	80.57	75.01	5.17	76.92	38.46
Idaho	75.28	70.37	4.94	72.92	.....
Arizona	70.94	65.03	5.05	166.66	12.82
Wyoming	57.68	53.51	3.86	62.50	31.25
Montana	47.82	44.44	3.28	59.72	4.98
Alaska	46.09	41.43	3.33	400.00	200.00

NOTE: Recent immigration to the newer states of the west and northwest causes the induction figures to be too high and renders the nativity rates for those states unreliable. The induction figures were used as the divisors. The rates for the colored troops for other than southern states are probably unreliable due to the small strength and small number of cases.

SUMMARY

1. Influenza prevailed much more extensively in the Army in 1917 and during the early months of 1918 than has been commonly recognized. There were 40,512 cases of this disease reported in the Army for the year 1917.

2. Unrecognized influenza was probably the primary and underlying cause of many of the atypical and fatal pneumonic infections occurring in the army camps during 1917 and the early months of 1918, in addition to the cases known to have been associated with measles.

3. Influenza in 1917 and the early months of 1918 was relatively mild in type as compared with the virulent type of the disease which appeared in army camps in September, 1918.

4. The extension of the virulent influenza from Camp Devens to other camps south and west in September, 1918, can be traced in many instances directly to the interchange of military personnel from infected to non-infected camps. The contagion was transferred by persons either themselves infected or who were carriers of the disease, and the extension definitely followed ordinary lines of travel.

5. The height of the September outbreak of the disease in the United States extended over a period of about nine weeks (September 13 to November 15, 1918). During this period over 20,000 deaths occurred among troops in the United States alone in excess of the number that would have occurred if the disease death rate for the corresponding period of the preceding year had prevailed.

6. The height of the epidemic in France extended over the same period of time as in the United States.

7. Influenza and pneumonia were less prevalent and less fatal among our troops in France than in the United States.

8. The "cantonment" group of stations gave a much higher death rate from influenza and its complication than other groups. (Tent camps or permanent posts.)

9. For the entire Army (approximately 3,500,000 men) there were 688,869 admissions charged to influenza for the year, or 20 per cent of the command. This record does not represent the full incidence of the disease during this period.

10. There were 47,384 deaths from all diseases for the year 1918, of which 23,007 were attributed to influenza. In addition, 16,364 were due to pneumonic infections, bronchitis and pleurisy, many of which, it is certain, should have been charged to influenza, making a total of 39,371 due to acute respiratory diseases, or 82 per cent of the total deaths from disease for the year. Influenza with its complications is charged with 48.5 per cent of the total deaths from disease for the year.

11. Influenza was more prevalent among white troops than among colored.

12. White soldiers from the south had much higher admission and death rates for influenza, penumonia and other acute respiratory diseases than white soldiers from other sections. The lowest rates for these

diseases were among white soldiers from the Pacific coast and Rocky Mountain states.

13. The negroes stationed in the United States had lower admission rates for influenza than the whites for the country at large, and much lower for these diseases than the whites from the south.

14. The incidence rate for all forms of pneumonia, both primary and secondary, was nearly three times as high for the colored as for the whites for the entire country.

15. The death rate for all pneumonic infections was more than twice as high for colored troops as for the whites.

16. The case mortality for all pneumonia infections for the colored was about 20 per cent lower than for the whites.

THE FOUNDING OF THIS ASSOCIATION, AND ITS FOUNDER, AS I KNEW HIM. AN ANECDOTAL SKETCH OF PROFESSOR, DOCTOR NICHOLAS SENN[1]

By Dr. HORACE M. BROWN

AT THE time I attended the meeting of this Association in October of last year, at St. Louis, I was much surprised to find that a number of gentlemen wearing the uniform of colonel and lieutenant colonel in the Medical Corps of the Army, and gentlemen of the Navy, upon whose sleeves and shoulders I saw the insignia of the rank of captain, lieutenant commander and commander, when I told them that I had been one of the founders of this society, looked upon me with astonishment; and I did not realize until then that almost two generations of men had grown into years of great responsibility since the time of which I shall speak.

When I was called upon by Colonel Church, asking me to write a paper for this session, being addressed by him as one of the "first inhabitants," I felt assured that while I had not yet reached the age of which Folengo writes when he describes the old Mantuan, Tognasse, as "coughing out the oysters in front and pushing out the shells behind," yet I thought that in the choice of a subject for a paper I could not go far wrong if I described to this new generation the main conditions under which surgery was practiced at about the time this society was founded.

Therefore I have taken as a title for my paper, "The Founding of this Association and Its Founder as I knew Him." An anecdotal sketch of Professor Nicholas Senn.

This is not to be a scientific paper. You will have had enough of that sort of thing before the session is completed. Rather will it be an attempt to tell you something about the origin of this Association and also to give you some recollections of the man who, seeing the need of an improvement in the medical service of the National Guard of the various states of the Union, founded it and fostered it until it was able to stand alone. I refer to the founder of the Association—Professor, Doctor Nicholas Senn of Milwaukee and Chicago.

First: I will give a short sketch of his life and then a few anecdotes to illustrate the character of the man.

Dr. Nicholas Senn was born in the village of Buchs, Canton of St.

[1] Read at the meeting of the Association of Military Surgeons of the United States, at New Orleans, La., April 22-24, 1920.

Gall, Switzerland, October 31, 1844. He came to America with his parents in 1852 and grew up in the village just at the cross-roads of Ashford, Wis. He attended the local school, graduating from the Fond du Lac high school at the age of twenty. His opportunities for earlier schooling were limited by the need for his labor with his father in the support of a somewhat large family. He taught school for a number of years, at the same time studying the rudiments of medicine under the preceptorship of Dr. Emanuel Munk, at Fond du Lac. In 1865 he entered the Chicago Medical College, and, working his way, graduated from that institution in 1868. In 1869 he married and commenced practice in Ashford. After a period of five years—namely in 1874—he came to Milwaukee, where he developed a phenomenal practice and a great reputation as a surgeon. Between the years 1874 and 1893 his activities in surgery and in investigative work, as well as in developing the hospital conditions in Milwaukee, made his name famous not only in America but in Europe as well.

In 1884 he began his career as Professor of Surgery in Chicago at the College of Physicians and Surgeons, living in Milwaukee and going to Chicago for the performance of his clinical work and the delivery of his lectures. In 1888 he was made Professor of the Principles of Surgery at Rush Medical College, and, in 1891, Professor of Clinical Surgery. He likewise taught military surgery at Northwestern University and at the Chicago Polyclinic.

Nicholas Senn was a born teacher, a good speaker, possessed of a marvelous memory for detail and a capacity for illustration of his subject that is as rare as it is essential to success for a teacher. He was a brilliant operator, in plastic surgery almost unequalled for his time. As he grew older, his tendency toward too great daring was succeeded by a well-considered conservatism and a more rigidly exact technique based upon careful experiment and observation.

In 1888 he was made Surgeon General of Wisconsin, which position he held until he left that State to reside in Chicago. In 1892, Governor Altgelt commissioned him Surgeon General of Illinois, and it was while in these state appointments that he realized the great need for improvement in the character and efficiency in the medical staff of the National Guard of the country. It was in the spring of 1891 that he first conceived the idea of the organization of a National Association of the surgeons of the National Guard, and it was in September of that year when, after having discussed the idea with representative National Guard surgeons and with the men at the head of the Medical Departments of the Army and Navy at Washington, he called together about thirty of the surgeons of the National Guard of the various states at

Chicago and with their concurrence put into organized form "The Association of Military Surgeons of the National Guard," the original organization, of which this association is the development.

At the outbreak of the Spanish-American War he took charge of the camp at Springfield, Ill., and on May 13, 1898, being commissioned lieutenant colonel and chief surgeon, U. S. V., he was assigned to duty with the Sixth Army Corps, being on duty at Chickamauga Park and in general charge of the Leiter Hospital.

In July, 1898, he went to Santiago, Cuba, with the expedition under command of Brig. Gen. Guy V. Henry, being on duty with the Army of Invasion as "Chief Operating Surgeon in the Field." He later served on board the U. S. hospital ship *Relief*. He resigned September 6 and was honorably discharged September 17, 1898.

Nicholas Senn was a most prolific writer. He traveled much, and each new journey was an inspiration for new products from his pen, ranging from speculations upon the politics and policy of foreign governments to descriptions of the flora and fauna, or the activities of the surgeons of the land last visited by him. His text-books—although with the development of surgery in the past twenty years, now out of date—for their time, exhibit the great capacity of the author for assimilation of knowledge, a wonderful capacity for observation and facility for communication of that knowledge to his readers and students.

He earned much money and gave with a liberal hand. He endowed rooms and beds in a number of hospitals, presented the Senn Clinical building to Rush Medical College, spent lavishly of his means for the extension of medical education, for the founding and maintenance of scientific societies, was a collector of books, and always a persistent student of all and everything that pertained to the profession which he so highly ornamented.

He purchased the great collection of books belonging to Professor Baum of Gottingen, and that of Dubois-Reymond of Paris, presenting them to the Newberry Library, from which library they passed to the Senn department of the great Crerar Library of Chicago.

A close observer, an intellectual giant, nothing was too small or too great to have an interest for him, and his unusual memory made all that he saw or learned of immediate availability at any time, and all that he knew was always at the service of those who knew and understood him. Unassuming, always an encourager of young men, capable of untiring effort, and a great judge of character, a perpetual worker, and endowed with vast ambition; he looked with scorn upon frivolity and laziness in those about him. Giving himself no rest in the pursuit of his own ambitions, he had no patience with the lack of these qualities in others.

With a mind capable of protean activities, he had the faculty of enlisting others with absorbing interest in his projects and adventures in investigation along surgical lines and in stimulating equal enthusiasms in all with whom he came in contact.

I never knew a man capable of such continued and untiring effort, nor one capable of such condensation of thought and energy toward the accomplishment of his ambitions, but he, like all other men of his mental characteristics, never reached a final goal, for with the approaching accomplishment of every one of his efforts, a new goal was ever before him, and ever in view a new problem to conquer and solve.

He was always at work, and in the midst of work for the satisfaction of a new ambition, death from myocarditis came upon him. He died on January 2, 1908, at the age of 64 years.

He was a great surgeon, a great organizer, a great teacher, a good linguist, a fine scholar, a clever botanist, a lover of beautiful things. Careless of his own person, he demanded care and neatness in others. Unpitying in his own treatment of himself, he was a fond and indulgent husband and father. To his intimates in the profession somewhat of a martinet, to his students and colleagues he was hospitable, helpful and kind, an inspiration toward perfection, and an impulse toward that studious labor which alone brings success in this profession of ours. Such was the man who founded this Association. To have been the moving spirit, the activating impulse that found its fruition in the development of this great and important organization was something in the world, something important to the country as well as to the individuals that compose the organization, and to have had the vision and the energy to make that vision a reality was to my mind an evidence of greatness of character and ability.

I have attempted to make a census of the sixty-three men who became members in Chicago on September 17, 1891, to try to learn how many of that group of men are still alive. I am not certain, but it is probable that but thirteen of the sixty-three are still living. In the course of twenty-nine years fifty of them have gone to their long rest, and, strangely enough, of the thirteen remaining men three are Wisconsin men. Whom the gods love die young.

While Senn boasted that he was never able to sit out any sort of musical entertainment, he nevertheless knew very well how to get all hearts among medical men attuned to his theme, and accordingly, upon that important evening of September 17, 1891, he gathered his guests from all parts of the United States together at a dinner at the Leland Hotel in Chicago and after the coffee and cigars were served, and after there had been opportunity for acquaintances to be made among the

guests, he announced the purpose of the gathering and his reasons for believing that such a purpose was well worth supporting not only for the improvement of the medical service of the National Guard, but as well for the uplifting of the professional standards of the men who were giving their time and enthusiasm to the country in their capacity as medical attendants upon the state soldiery.

The idea was received with enthusiasm, and, in the customary form, committees were appointed for working out the details. There were thirty-five men present at this dinner, of whom, so far as I can learn, but ten are still living.

The following day, at about nine o'clock, the entire party met at Rush Medical College and were entertained at a clinic by Dr. Senn, after which they dined at the Union Club, attended a meeting at the Chicago Polyclinic, and in the evening enjoyed a reception at the residence of Dr. Senn on Dearborn Avenue.

That afternoon at the Polyclinic, the organization of the Association of Military Surgeons of the National Guard was completed, and the infant that on that day had its birth was the child that was ultimately to mature into the strong manhood that is evidenced in this present organization.

I hesitate to approach the anecdotal portion of what I have thought might entertain you, for the reason that it is impossible for me to know whether or not you may be interested in the things that were happening in the surgical world at the period immediately following the announcement of the Listerian theory; the "Antiseptic" period of surgery, just succeeding the time when students and admiring surgeons were sitting in the amphitheater of Bellevue Hospital, seeing Prof. Jimmie Wood come in, take off his coat, roll up his sleeves, and, putting on an apron of rubber cloth to keep his trousers and white vest from getting bloody, do a hip-joint amputation with unwashed hands and unwashed instruments. What was the use of washing his hands; they would be bloody in a few minutes?

The period from the year 1881 until 1889 was the time during which I was most closely in touch with Dr. Senn, and had a part—with many others—in his struggle (a struggle which was taking place in all parts of the civilized world) toward the perfection of a technique that should develop antiseptic or aseptic methods to the result that operative work without infection of wounds might be possible.

It was in 1881 that, through the efforts of Senn, the new Milwaukee Hospital was established, and in it were combined all the most modern ideas of that time in regard to the carrying out of antiseptic surgery.

The operating room, facing south, had an asphalt floor. Of course

the hot sunshine through the many windows softened this, the casters on the legs of the wooden operating table sank into it, and when the asphalt again hardened the table could not be moved. There was one enameled iron sink with hot and cold water, and bracketed shelves were attached to the walls, upon which might be placed apparatus for the spraying of hot carbolic solution into all parts of the room. About the patient would be posted two or three student assistants holding similar steam carbolic spray atomizers, directed toward the field of operation, while the operator, Dr. Senn (perhaps having washed his hands before beginning the operation, perhaps not), in his ordinary clothes, his shirt sleeves rolled up to his elbows, and his abdomen and front adorned with a rubber apron, with Dr. William Mackie and me, his assistants, in similar costume, in the midst of the mist and odoriferous fog, endeavored to "accomplish our hellish purpose." The admiring gallery of onlookers could be dimly seen through the haze, hanging in trance-like admiration over the operating field, with the sweat from their unwashed beards and faces dripping into the opened abdomen or other wound.

Of course within a short time we were all suffering from melanuria, and the patients failed to respond with the desired unanimity to the expectation of union of wounds by first intention; nevertheless, for a short time we were satisfied that the fault lay not with the method and technique but with the individual propensity of the patients. However, it soon became manifest that there was a grave error in the principle involved, and the spray was quickly abandoned and a feverish and enthusiastic madness of investigation began as to how to eliminate the factors that were mitigating against success.

It was clear that the carbolic spray did not prevent sepsis. It was also clear that germs must enter the wounds, and probably from the hands of the operators. I believe that Dr. Senn was the first operator to use gloves—cotton gloves boiled before use—in operating.

At once there was an almost startling improvement in results in his cases. Next he began to insist that the "gallery" should not approach the patient. Again improvement in the results. Then began an effort at bacteriological examination of the skin of the patients and the hands of operator and assistants, and then of salivary spray from the mouths of those about the operating table. With each new experiment improved end results were obtained, so that within a year we were, in a way, carrying out all the precautions at the operating table now employed by surgeons—at least theoretically—and our results were good.

With the coming of that state of affairs, Senn was quick to see what might be hoped for in the invasion of new and previously almost untouched fields of surgical invasion, and then began that long series of

experiments in surgery of the joints, bone implantation, brain invasion, attempts at arterial grafting and nerve implantation which—while in many instances failing—nevertheless were some of the steps that have led to the present high position of surgical, almost exact, knowledge, and which in plastic surgery of the abdominal contents resulted in the development of a technique for gastroenterostomy and the whole series of operations upon the pyloric end of the stomach, gall-bladder and intestines, which today are matters of everyday occurrence. I well remember an operation preformed by myself on the second day of February, 1882, for a ruptured appendix, done under our very imperfect methods of aseptic procedure, which was entirely successful. I have since been informed that this was probably the first purposeful appendectomy ever performed.

I am by no means sure that this is true, and it is a matter of small importance anyway. There were about ten or twelve of us younger men engaged in all sorts of experimental efforts in plastic surgery within the abdomen, and it was at this time that a vast number of materials were used as intra-intestinal splints, ranging from indigestible substances like the barrels of hard rubber syringes, glass tubes, various kinds of buttons, these being introduced into the stomach to endeavor to find out how large a foreign body would find its way through the pylorus and the ileocecal valve, the object being to endeavor to discover some material which would serve as a splint within the intestine, upon which to develop the means for suturing the bowel in end to end and also in lateral anastomoses. I am now well aware that such things had been used with similar objects in view by the medieval surgeons, and that the men of that time had also used animal fibers for the purpose of suturing the bowels, but at the time of which I am writing I am sure that none of us were aware of those matters, and so far as we were concerned the work was original with us.

We found that any body that would pass through the pylorus would safely find its way through the ileocecal valve, and this fact being established, there began a slaughtering of dogs, and sheep, and cats, and rabbits in dozens of experiments, in developing a technique for intestinal anastomosis.

At last Senn suggested that decalcified bone might be used to make buttons, which being placed within the two parts of the bowel to be joined, might serve as anchors upon which to complete anastomosis of the parts. I cannot attempt to tell you the number of different digestible substances that were experimented with before the bone-plate operation of Senn became a success and was the foundation upon which Murphy of Chicago developed his metallic button.

You must remember that, at the time of which I am speaking, intestinal surgery had advanced but little upon the method used by Albucasis, which was to gather up protruding loops of intestine in case of wounds of the abdominal walls and, ligating them about, to cut off the extruding part, leaving, of course, if the patient recovered, an intestinal fistula; or the time in 1316 when Mondinus recommended that, in case the intestine should be punctured, the wound margins were to be drawn together by taking large ants by their bodies and letting them by means of their nippers, one in each margin of the gut, pull the edges together and then break the bodies of the ants away from their heads.

Up to the time of the development of this aseptic form of surgery the knee joint was a *nolo me tangere*. It was opened with prayer and closed with thanksgiving, and if the patient recovered it was considered a miracle. The abdomen was a portion of the body equally dangerous of invasion, but already in 1883 Senn was invading both the knee joint and the abdominal cavity with perfect impunity, and we were getting first-class results from our operations.

It was in 1883, after the removal of a huge multilocular cyst, that Senn stated at the operating table that there was a man named Keyes in London who had dropped the ligated pedicle back into the abdominal cavity instead of attaching it to the abdominal wound. He hesitated for a moment and then dropped the pedicle in his case back into the abdomen. I recall the great anxiety with which the patient was watched for the next few days, in fear as to the result of this step. However, the patient recovered, much to our satisfaction and somewhat to our astonishment.

Let me diverge a moment at this point to emphasize one of the traits of Dr. Senn. He was so sure of himself in regard to his abdominal work that after the patient left the operating table he would seldom see him until forty-eight hours had gone by, when he would enter the room, look at the charts, and if there were no manifest symptoms of sepsis, would ask the one question: "Is the gas passing off from your bowels?" If the nurse or patient would answer "yes" he would say, "qui crepitat vivat" and would go on and not see the patient again until he or she was ready to leave the hospital, so sure was he of the truth of the dictum of Hippocrates which he had quoted.

It was at this time also he began his famous series of experiments in injecting hydrogen gas into the bowels per rectum for the purpose of discovering, if possible, all of the wounds to the intestine that might arise from gunshot injury. It was found that hydrogen gas would not pass readily in a reverse direction through the ileocecal valve, and

that it was not until the colon and rectum were completely dilated with gas that it would pass into the small intestine and show itself through wounds in the gut made by small shot or buckshot. It was, therefore, necessary that there should be some basis of knowledge as to the capacity of the large intestine for dilatation, and our friends the dog and the sheep and the calf and the cat and the rabbit were again called into service for colonic inflation. And then, unknown to the patients, a series of experiments was begun upon them in the hospital, until it had been proved that the large intestine of the human animal has a capacity of one imperial gallon.

This knowledge once established, it was not difficult to measure the amount of hydrogen gas to be employed or the force that was necessary for inflation of the guts, Senn himself being the first to submit to the experiment. When this conclusion had finally been reached, an amusing incident occurred in Dr. Senn's practice which was quite as serious in its results as it was amusing in its nature. If you will bear with me for a moment, I will repeat to you a rhyme or jingle written by one of the men who was working with Dr. Senn at that time which will describe fully not only the facts of this case, but also will illustrate the profound and abiding faith that Dr. Senn inspired in those about him.

SCIENTIA VINCIT

In the "City of Beer" a student once lived,
In medical wisdom profound;
But of practical skill he had not a jot,
As later on in this tale I'll expound.

And this young man's preceptor, a surgical wight,
Was a man who much had explored
The abdominal space, and through the whole gut
Much hydrogen gas he had poured.

And the young man's chief pride in his preceptor was;
His master in surgery bold;
And he thought it a duty and also a joy
To do what he by him was told.

Now it happened one day that an Irishman came
And complained in a terrified tone,
That his wife was stopped up with an horrible mass.
Her movements were hard as a stone.

The surgeon, he ordered some Comp'. Cath'. pills.
Signa: "Three to be taken at night."
"If the bowels don't move, let me know in the morn,
My student will fix them all right."

With a miserable air of distress and despair
Came the Irishman early next day,
And said, "Thim pills didn't worrk, and divil a thing
Since I gave them has yet come away."

The surgeon, he turned to his student and said,
"A clyster we'll give her and see
If we cannot succeed in dislodging this mass;
An impaction it surely must be."

"How large an injection shall I give?" asked the lad.
"What! How often must you be told
That the colon from anus to ileac valve
An imperial gallon will hold?"

Our student, surprised at the measurement given,
Simply packed up the syringe and said:
"I'll go with the man and I'll give her the squirt,
For my pride is to do as I'm bade."

When arrived at the house, on a large yellow mug,
Standing out on the floor of hard ground,
With a look of distress on her vixenish face,
A little, weak woman he found.

Said he: "My dear madame, how long is it now
Since a natural movement you've had?"
"Sure, Docther," said she, "'tis tree weeks today,
And the cramps in me stomick is bad."

Then he filled up a basin and measured with care,
Of hot water eight pints to a drop,
And stirred in yellow soap with a prodigal hand,
'Til the foam stood up high on the top.

Then persuaded the woman to lie on her side
On the bed that stood up 'gainst the wall,
And filled up the syringe, and began to inject,
Though the patient in anguish did bawl,

"Holy Mary! Saint Joseph! Sweet Mother of God!
Och, Docther, me insides ye will bust!"
"Be perfectly calm, dear madame," he said:
"On my knowledge you surely may trust.

Your colon and rectum combined will contain,
Of water, four quarts to a dot.
Lie perfectly still, and I soon will be through.
Let's get it all in while it's hot."

"Mea Culpa! Saint Mary! Saint Peter and Paul!
Don't, Docther! I'm full as a sot!
I can't howld any more! Och, darlin', please stop,
Or I'll bust! Let me get on the pot!"

"It cannot be true that you yet are quite full,
Of the gallon, there yet does remain
A pint and a half, which I will inject,
If your fears you will only restrain."

So the student he pumped, and the woman she screamed,
"Holy Mary, pray for me soul!"
KLSCH—"Don't, Docther! I'm dead!' KLSCH—"pull out the spout!"
KLSCH—at last, nought remains in the bowl.

And science had conquered. In the bowl not a drop
Of the foamy concoction remained,
And the woman, though dead as she lay on the bed,
The whole of the mixture retained;

And the student, he packed up the syringe and left,
And quick to the office he sped,
Told his master: "Your patient has gone on before.
But I put in a gallon," he said.

About this time, also, Dr. Senn found himself deeply interested in cysts of the spleen, and attempted to get together a number of cases of this form of disease of that organ.

You must remember that this was still in the days of laudable pus, before the days of the Roentgen ray, bacterial classification, the discovery of the tubercle bacillus, when scrofula was still scrofula and not tuberculosis; that there was no diphtheria antitoxine, no knowledge of the spirochete pallida, no phagocytosis, no side-chain theory, blood-counts were but an amusement relating to anemia, the sphygmograph was but a toy, and all of the advances in the perfection of knowledge of and in definite classification of diseases were as yet things of the future, and diagnosis was a much finer art than it is today.

Among my patients there appeared a woman with a large tumor in the region of the spleen which gave no distressing symptoms other than it somewhat deformed her appearance. An extremely careful examination of the woman convinced me that I had to deal with a large cyst of the spleen, and with much triumph in my manner I presented the case to Dr. Senn for examination. He was also convinced of the correctness of my diagnosis and called in a number of other medical men for their examination and opinion, and all agreed that the much desired cyst of the spleen had been found, and as I had been the discoverer of the case, I was called upon to operate upon it in the presence of a large gallery of interested medical spectators.

The abdomen was opened and how great was our fall, for, instead of any disease of the spleen whatsoever, the large intestine was found attached to the abdominal wall and contained a huge stercolith with a large hole passing through its center horizontally, through which the

fecal matter of the bowel was passing from the hepatic flexure into the descending colon. I believe that the first posterior gastroenterostomy for carcinoma of the pylorus that was ever done in this country was done by Dr. Senn early in 1882 upon a gentleman named Quinn. At the time of which I am mentioning, we saw many cases of enormous fibroids and multilocular cysts, a true description of which would not be believed by those who did not live at that time. In these days, such things are operated upon earlier and it seldom occurs that one is called upon to operate for the removal of fibroid of the uterus or a cyst, which when removed weighs as much as the carcass of the patient left behind. But such things were not infrequent at the time of which I am speaking. Lumpjaw was of most common occurrence and interested Senn greatly. I know of no operator who has ever gone as far in an attempt to enucleate actinomycosis extending into the mediastinum and about the great vessels, as Senn.

To illustrate one of the characteristics of the man about whom I am speaking—that is, his capacity for concentration of thought upon the particular line of investigation which he might be following at any time—it happened one day, at the time when he was carrying on his experiments with ligation of blood vessels in continuity, that I was riding with him from his office to the Milwaukee Hospital. He had an old horse that he called Charlie. We were sitting in his buggy, he talking earnestly about the problems in relation to ligation of arteries. We turned into the driveway of the hospital and began climbing up its steep grade. When we were about half way up the horse dropped dead, and Senn, without for a moment breaking the thread of his discourse upon what he was doing, stepped out of the buggy, did not even look at the horse, and with me by his side climbed up the rest of the incline, opened the hospital door and walked in, and was almost at the operating room before it occurred to him that anything unusual had happened.

It was my privilege to have crossed the ocean with him a number of times, and on his ocean voyages his habit was to work at least eight, sometimes ten hours a day at his writing.

At some time in his career he had gone to the little town of Mayville, in Wisconsin, and there by chance had bought some cigars of a small local cigar maker. What they were made of I never was quite able to understand, but he found them to be perfection and entirely to satisfy his taste. Whenever he went to Europe he would order boxes of them to be sent to the various cities that he expected to visit, and he would give himself much trouble and go to great expense in paying duty upon this tobacco, although to the taste of the average smoker the contents of the box were never worth the value of the label.

Aboard ship he would go into the smoking room with a pile of manuscript and a lot of blank paper and a box of these cigars. Unmindful of all the noise from the card tables, from the drinkers, from the betters among the passengers, so deeply immersed in what he was thinking and doing that he was absolutely unconscious of anything about him, he would sit for hours smoking his Mayville cigars and writing and piling up additional leaves of his manuscript.

At four in the afternoon he would go out to his chair on deck, sleep for an hour and return to the smoking room, continue his writing—often going without his dinner—until a late hour of the night.

Shortly after the perfecting of his bone-plate operation upon the intestine, he went to St. Petersburg to the International Medical Congress. Professor Reverdin of Geneva had written to him asking him to come to Geneva to demonstrate the operation. Senn was unable to go and sent me in his place. This, I thought, was one of the greatest privileges of my life, for at that time Kocher and Reverdin and a number of the surgeons of Switzerland were carrying on their epoch-making investigations into the functions of the thyroid and were developing the technique of thyroidectomy, and it was my privilege, after having demonstrated the bone-plate anastymosis upon a sheep in the amphitheater in Geneva, to spend about three weeks with these men and thus through Dr. Senn to know them well and to have had an early advantage in understanding the problems that they were solving.

Senn was one of the earliest men to conceive the idea of bone transplantation and to emphasize the need for early mobilization of the knee joint after resection. I have brought with me here today a pair of the bone plates such as were used by Senn in 1882, and you will readily understand how, when they were passed into the two portions of the intestine that were to be anastymosed, they would perfectly serve their purpose as splints. Of course we now know that they were unnecessary, but without them as a splint for the support of the intestine in the early days of this investigation, I doubt if we would ever have reached our present perfection in that form of plastic abdominal surgery.

I have said that Senn was an organizer and teacher. A teacher is born, not made, and the man who feels within him the impulse for teaching necessarily needs someone to teach. Senn had not been in Milwaukee more than a year before he began looking about for an audience. He found that the Medical Society situation in Milwaukee was at the lowest state of decay. The county society had been in a state of desuetude for a long time. He resurrected it, made it over, developed enthusiasm, and in its renewal and increase in membership found an audience which derived great benefit from his teach-

ings. He also organized the Verein Deutscher Aerzte, a society made up of the German physicians of Milwaukee and a few American born men who had attended classes in German universities. In 1884, for the purpose of teaching and stimulating a desire for knowledge among the younger medical men of Milwaukee, he caused the Milwaukee School of Anatomy and Surgery, a properly incorporated medical school but really organized only for the purpose of making dissection and anatomical investigation easily available, to be developed. It was shortly after this that his fame became so widespread that he was called to Chicago to begin his teaching work there.

Just as Milwaukee student physicians went to Europe to observe and profit from the work of great European surgeons, so many well-known surgeons of the old world came to America and made their pilgrimage to Milwaukee to hear and see what Senn was doing.

I well remember the coming of Von Esmarch with his beautiful wife and the royal entertainment, in which I participated, that Senn offered to this distinguished surgeon. Many of the men prominent in French, Swiss and Spanish medicine came to Milwaukee to visit Senn. Unless I am mistaken, it was at his clinic at the Milwaukee Hospital that I first saw the great Spanish physician, Ramon y Cajal.

Senn's going away from Milwaukee was a tremendous loss to the faculty of that city, but he left behind an influence upon those who had been closest in contact with him that remains today as an inspiration and an impulse to continue his effort toward improvement in all that goes for making men ethically better, more skillful and more worthy of the name of physician.

It is very far from my intention to convey to you that I was singularly prominent in the work that was led and directed by Dr. Senn. Without the skill of Dr. Connell of the County Hospital, the bone plate would never have been a practical thing, and to the efforts of Drs. William Mackie, Bading, McDill, Kaumheimer and the many students who were gathered about Senn at that time, I am sure a great part of the merit for the detail work is to be credited. Mine was but a small part in the prosecution of the investigative and demonstrative labor of the time under consideration.

I could tell you a thousand things of Senn's skill in botany, of his marvelous faculty for grasping the nearest simile with which to illustrate a point in his discourse; many stories of his carelessness of dress; that tremendous power for application which I have known him to exercise to the point of working all day for three successive days and to sit writing in his study the entire two intervening nights without sleep or rest. The fact that when he was in his creative moods he was

quite unaware as to whether he had changed his clothing, eaten or slept—such was the thrust of his hunger for work and for the satisfaction of his ambitions. He was very familiar with many of the customs of the Indians of northern Wisconsin in regard to their forms of medical treatment. He was deeply interested when in South America in some of the diseases peculiar to Peru. He was very fond of hunting and in that pastime found his greatest relaxation, and although so entirely a student and so complete a slave to his desire for knowledge, yet he was passionately fond of flowers and of beautiful things. In books he took an absorbing interest, as was shown by his benefaction to the Newberry and Crerar libraries in Chicago.

Gentlemen, I hope I have painted a picture of Dr. Senn that will give you at least some idea of the character of the man, especially of the nature of his enthusiasms and his work, and I beg you to note that our gathering together here today is but an evidence that the work of Senn has lived after him. He would be the last, if he were alive, to look for commendation for any of his acts. Much that I have told you is a mere matter of memory and may be inexact, but at least I hope my words will have painted for you a pleasing portrait of a most remarkable man.

If you have found that there have been too many repetitions of the personal pronoun "I" in this paper, I beg your forgiveness and ask your charity for a frequent failing of those who have reached the age when "sans teeth, sans eyes, sans taste, sans everything" their eyes purge "thick amber and plum-tree gum."

A NOTE ON THE EPIDEMIOLOGY OF INFLUENZA

By Major MILTON W. HALL

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(With three illustrations)

THE publication of several articles[1] emphasizing the rôle of the hand in the transmission of respiratory infections, and especially of influenza, leads to the recording of the following observations that bring out other factors that should be considered in evaluating the relative importance of different means of transmission of infection.

In going over the records of the 1918 epidemic, the writer, while epidemiologist at Camp Jackson, was struck by the widely differing rates of incidence obtaining in two groups of the camp population. These were on the one hand the regiments of the Field Artillery Replacement Depot, the so-called F. A. R. D., and on the other the 56th Field Artillery Brigade. The former group showed a rate higher than that of the camp as a whole, the latter one very much lower. In most respects the two groups lived under the same conditions. They were subject to the same camp rules with regard to the intermingling of troops during the epidemic. Neither group used the mask; neither was sprayed. Both groups were on an easy training schedule to avoid fatigue and were given outdoor recreation to sustain morale. The F. A. R. D. regiments were not quartered in any one section of the camp but practically surrounded the 56th Brigade.

On inquiry of the medical officers in charge at the time it was found that one decided difference existed in the region of the two groups. The messkits of the F. A. R. D., while individually washed, were dipped in two changes of actively boiling water, the cans remaining on the fire during the process. The surgeon of the F. A. R. D., Maj. W. J. Kesterson, states that this regulation was strictly observed during the period of the epidemic. The "old-line method" of washing was used by the 56th Brigade with no attempt to maintain a sterilizing temperature in the water used. The camp surgeon is my authority for the latter statement.

The 56th Brigade, during the period of comparison, had 35 cases of influenza or broncho-pneumonia, a rate of 8.1 per 1,000 on an average strength of 4,300. The F. A. R. D., with 24,600 men, had 5,273 cases or 214 per 1,000 (Table I).

Obviously some factor other than the care of the messkits was responsible for the disparity in the rates, and by analogy with other

[1] Lynch, C., and Cumming, J. G.: Military Surgeon, 1918, 43, No. 6; Cumming, J. G.: *Am. Jour. Pub. Health*, 1919, 9, p. 849.

respiratory infections we should expect that relative length of service in the two groups might enter into the calculation.

The F. A. R. D. was essentially an organization of newly drafted troops. Its purpose was to supply replacements for artillery organizations with the minimum time spent in training. While exact figures are not available, it can be definitely stated that the average service period for the group was less than three months, while certain regiments were made up of very recent recruits. The 56th Brigade was of more varied origin. Its original nucleus consisted of National Guardsmen from Alabama, Georgia and Florida, most of whom had seen service on the border. To these were added a quota of drafted men in the fall of 1917 and another early in the summer of 1918. Probably two-thirds of its men had seen more than a year's service, and few, if any, less than three months.

There was then in length of service a possible factor, which if active, was sufficient to overcome any advantage accruing to the F. A. R. D. in the superior method of handling messkits. There were moreover decided differences in case rate among the regiments of the F. A. R. D. itself. These regiments had been organized in the order of their numbers, but with trained men leaving for overseas, transfers and reorganizations constantly going on, some of the newer regiments had seen comparatively long service. The newest regiments as a whole at the time of the epidemic were the 7th, 8th and 9th, which had been filled from the latest draft to arrive in camp. These regiments totalled 6,681 men and had 2,548 cases of influenza, or 396 per 1,000. The other F. A. R. D. regiments with 17,931 men had 2,725 cases or 152 per 1,000 (Table II). This difference confirms the supposition that length of service tends to protect against influenza as it does against other better known respiratory infections.

A search of the clinical records at the base hospital showed that of 9,261 cases diagnosed as influenza or broncho-pneumonia during this period only 1,677, or 18 per cent, were credited with more than three months' service, while 7,584, or 82 per cent, had been in the Army less than that time. It again proved impossible to obtain exact figures showing the proportion of recruits in camp during the epidemic. Considering the rate of induction of new men during the summer, the average stay in camp, the very considerable permanent camp personnel, and the trained organizations at the firing center, it is probably not an over-estimate to say that one-half of the camp population had seen service of three months or more. On this basis again it would appear that the recruit is far more susceptible to influenza than is the seasoned soldier.

An explosive character of outbreak, showing on the daily incidence chart by a sharp rise, high peak and abrupt drop, is regarded by Lynch and Cumming as characteristic of organizations using careless methods of dish-washing. This type of curve is seen in the regiments referred to as having the highest sick rate for the period, while the regiments with a low rate showed a flattened curve with the cases spread

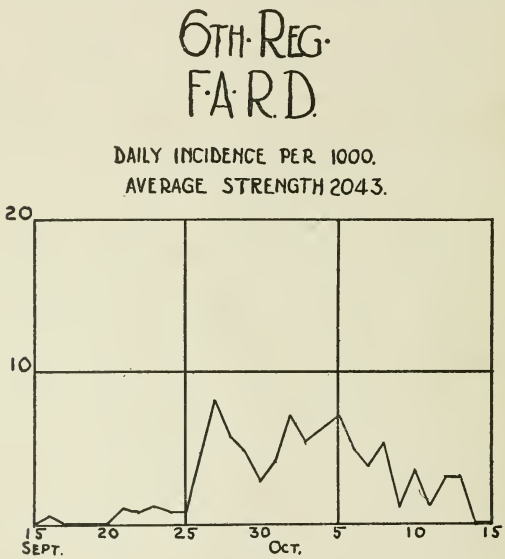

Chart 1.

over more days. The difference is well shown in the curves of the 6th and 7th Regiments of the F. A. R. D., which occupied contiguous areas in the cantonment and were living under identical regulations in every way, but which differed in the large proportion of recruits in the latter. The 6th Regiment (Chart 1), 2,043 strong, had 165 cases, or 83 per 1,000, the incidence extending over 33 days with the highest daily rate 8 per 1,000. The 7th Regiment (Chart 2), with 2,260 men had 915 cases, 398 per 1,000, extending over only 19 days, and a maximum daily rate of 49 per 1,000. These regiments were using exactly the same methods in the handling of their messkits. May it not be that this type of curve characterizes a group of high susceptibility from whatever cause?

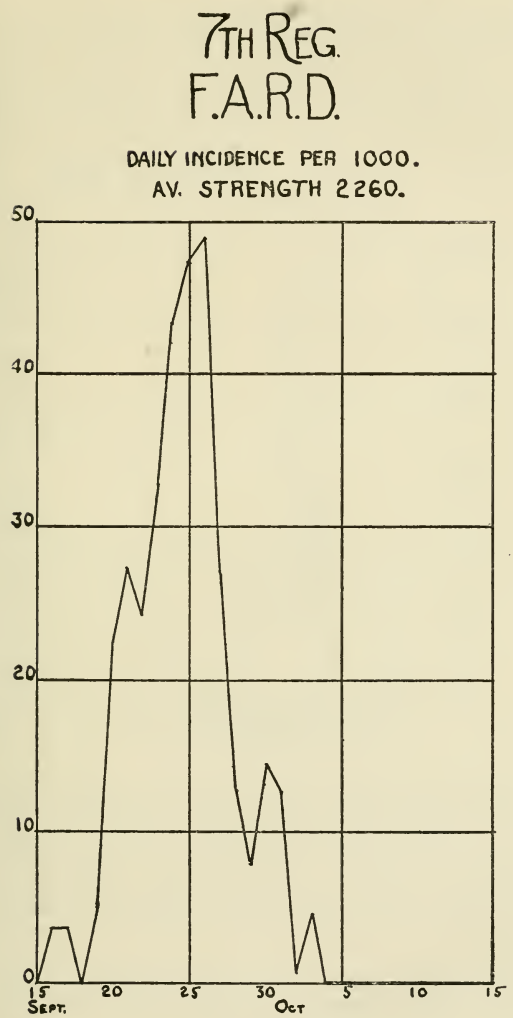
7TH REG.
F.A.R.D.
DAILY INCIDENCE PER 1000.
AV. STRENGTH 2260.
50
40
30
20
10
0
15
SEPT.
20
25
30
OCT
5
10
15

CHART 2.

In January, 1919, a small return epidemic visited Camp Jackson. This involved first and mainly the 48th Infantry, which had been at Camp Sevier during the autumn outbreak. In this regiment it was easy to trace the progress of the disease from company to company at three or four-day intervals until the entire regiment had been attacked.

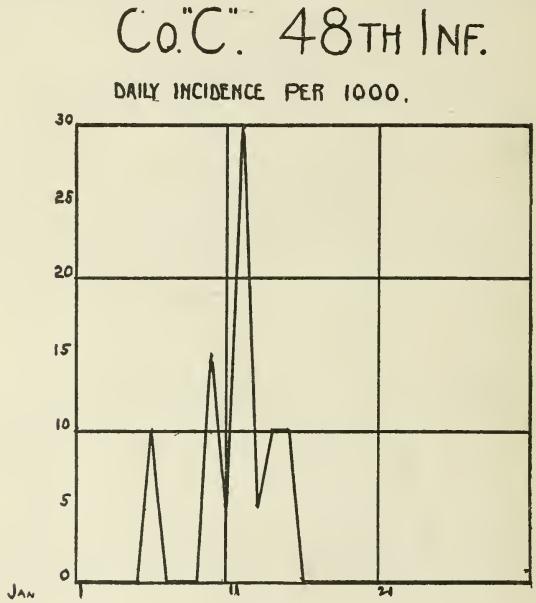

Chart 3.

An investigation of the methods of dish washing in vogue was promptly made, and it was found that one organization, Company C, owned a set of dishes and practiced collective washing while the others of the regiment were dipping with no particular care given to water temperature. Company C showed a case rate of 90 per 1,000 as compared with 56 per 1,000 for the entire regiment during this outbreak. Its curve of incidence shows fairly well the explosive character referred to (Chart 3).

These isolated and somewhat casual observations are not advanced as tending to prove the negative of the contention of Colonels Lynch and Cumming. The sterilization of eating utensils is a manifestly desirable measure and will undoubtedly tend to lessen disease wherever

efficiently practiced. The object here sought is merely to call attention to the fact that other factors may cause great variation in the incidence rate of respiratory infections, that unless comparative statistics are strictly controlled by all the factors known to affect the susceptibility of the groups compared, misleading conclusions may be drawn, and that there is perhaps danger that undue emphasis on one method of prophylaxis may lead to neglect of others equally essential.

TABLE I.—*Comparison of Incidence of Influenza in the F. A. R. D. and in the 56th F. A. Brigade.*

	Strength	*Cases*	*Case rate per* 1,000
F. A. R. D.	24,600	5,273	214
56th F. A. Brigade	4,300	35	8.1

TABLE II.—*Comparison of Incidence of Influenza in the Newer Regiments and in the Older Regiments of the F. A. R. D.*

	Strength	*Cases*	*Case rate per* 1,000
Newer Regiments	6,681	2,548	396
Older Regiments	17,931	2,725	152

THE OTHER SIDE OF THE QUESTION OF INDIRECT CONTACT INFECTION IN ACUTE RESPIRATORY DISEASES

By Lieutenant Colonel THOMAS W. JACKSON

Medical Reserve Corps, United States Army, Assistant to Commissioner of Health of Pennsylvania

DURING the year past there has been proposed with some insistence the doctrine that indirect contact infection plays the largest part in the spread of acute respiratory diseases and that direct droplet infection is nearly negligible; or to use the language of the chief exponent of the doctrine, in speaking of influenza, "The majority of influenza cases have arisen from interchange of sputum, through contaminated eating utensils." He also states that "The distribution of infection from the secondary case is limited to only minor routes which are of slight importance." [1]

Again he states the doctrine thus: "Above all is the necessity for popularizing our knowledge that it is the sputum-soiled hand and the contaminated eating utensil which plays the chief rôle in mouth-to-mouth infections." Again: "The vehicles for the transfer of germ-laden saliva from, and to, the mouth and nose, are the hands and eating utensils." [2]

That this propaganda has made its impression upon medical minds as well as upon the minds of laymen is evidenced by frequent editorial reference made during the year past in medical journals, with some signs of a disposition to accept the theory.

In justification it has been pointed out that editorial comment is supposed to take up new thought and is rarely conclusive; that it raises issues and expects to bring return fire.

The indirect contact doctrine has been reiterated, republished and disseminated through Sunday newspapers, luridly illustrated and purporting to have governmental sanction.

The imprimatur of medical journals has practically been used in these syndicated Sunday articles which endeavor to teach the public that doorknobs and the unsterilized knife, fork and plate are deadly, and that the sneeze, the cough and the projected mucus droplet are practically harmless and negligible.

While public health authorities everywhere, federal, state and municipal, are endeavoring to warn the people of the country of the dangers arising from droplet infection and therefore from crowded places, and are urging them to suppress and cover coughs and sneezes and otherwise to lessen droplet projection and the spread of respiratory infections

[1] Cumming, J. G.: *American Journal of Public Health*, November, 1919, p. 853.

[2] Lynch, C., and Cumming, J. G.: *American Journal of Public Health*, January, 1919, pp. 36 and 37.

thereby, the revolutionary propaganda of the indirect contact advocates goes on, without seeming to awake realization of the possibility that it may defeat public health educational efforts along correct lines.

In my opinion it is improper and dangerous—with the evidence offered—to teach the public—or the profession, for that matter—that "conveyance of respiratory diseases by indirect contact infection possesses an importance far transcending droplet infection." The responsibility for the dissemination of such doctrine is not a light one.

In the presentment of both argument and statistics in December, 1918, before the American Public Health Association in Chicago, and later in medical journal articles here cited, the exponents of indirect contact infection have attempted to show that influenza incidence was profoundly affected and reduced in 66,000 troops in Newport News, Va. and vicinity in October, 1918, among the men whose tableware or mess-kits were washed in boiling water.

They failed to emphasize, however, in their several communications, the fact that the troops at Newport News were largely colored troops, whose low susceptibility to influenza was thoroughly demonstrated by observers in many camps. No attempt was made to measure or estimate the factors of susceptibility or relative immunity through race, rural or urban origin of troops, previous exposure or duration of exposure, either at Newport News or vicinity.

In one of the later contributions on the subject, "Influenza-Pneumonia as Influenced by Dishwashing in Three Hundred and Seventy Public Institutions,"[3] the reporter seems to have disregarded all other factors than that of steam dish-washing and to have omitted from consideration the fact that in institutions where steam dish-washing installations exist there are sure to be other modern installations and hygienic practices and arrangements.

An intensive experience with more than 100,000 soldiers in three camps—Meade, Custer and Bowie—during the respiratory disease epidemics in 1917 and 1918 gives me a profound conviction that contaminated dishes, eating utensils and bad dishwashing arrangements—disgusting and unpleasant as they admittedly are—had little to do with the spreading of influenza or other respiratory infections in 1917 or 1918.

At Camp Meade I carefully analyzed the influenza incidence statistics covering 42,000 soldiers and found that dish-washing methods had no effect whatever in influencing the number of cases at that camp. The only deterrent factor observed there was that of race, the colored troops having a much lower per cent incidence. These facts were duly reported in the monthly epidemiologic reports to Washington.

[3] *American Journal of Public Health*, November, 1919, pp. 849-853.

From the Great Lakes Training Camp (50,000 young men) Surgeon Mink, U. S. N., reported at the Chicago meeting in December, 1918, that the influenza incidence in organizations using dishes and eating utensils washed in bulk, and practically sterilized, did not differ from the incidence in troops using the older and far less sanitary method of dish-washing, by dipping into common containers of wash water.

In other camps and in government laboratories statistical studies and experiments were inaugurated to determine the probable truth or fallacy of the "indirect contact" doctrine, and the publication of the results of these inquiries will be interesting to the adherents of both sides of the question. The findings will be published in due time, no doubt, and meanwhile newspaper propaganda should cease, awaiting professional judgment.

To preach the harmlessness of crowds and of droplet projection or to deny that aerial pathways of infection are of the highest importance cannot fail to arouse protest from public health authorities whose duty it is to instruct the public.

The real danger arises not from the judgment of thoughtful men who weigh evidence and refuse to accept dictum for proof, but from the unthinking who accept the seal of a copyrighted syndicate newspaper article as the hallmark of truth; nor do I desire by this remark to belittle the value of public health teaching through the public press. Let us see to it, however, that such teaching is harmless.

Carried to its logical conclusion the newly advanced doctrine is that the infectious respiratory diseases are chiefly acquired by ingestion.

It is a significant fact, it seems to me, that in the public services, everywhere, none of the injunctions based upon the older conception of droplet projection and direct transference of respiratory infections have been abrogated or modified.

In their paper read at Chicago before the American Public Health Association in December, 1918, and published in the January, 1919, issue of the journal of that Association the effective range of droplet projection was given by Lynch and Cumming as 18 inches.

They qualify their statement by specifying "mouth pathogens in droplets expelled by coughing" and contend that these bacteria probably will not infect plates placed on the level with the mouth beyond the maximum distance of 18 inches. They assert that the probability of infection by the flight of organisms is remote.

In contravention of this view attention is invited to the reports of experiments by Doust and Lyon[4] wherein they show by bacteriologic experiments that droplets are projected in ordinary speech, loud speech and coughing from 1 foot to 6 feet.

[4] *Journal of the American Medical Association*, October 12, 1918, p. 1216.

There are many other authentic experiments of record and every one will recall instances wherein he has personally experienced perceptible spraying of the face, by cough, sneeze, explosive laugh or speech, through much greater distances than 18 inches.

Indeed, a veritable barrage of minute droplets may be assumed wherever a fair-sized group or crowd is congregated, even out of doors, particularly if its members engage in singing, cheering or even ordinary conversation. Under such circumstances thousands of possibilities of infection might occur within a few moments.

It should be borne in mind that the term "spray infection," as generally used, means visible and perceptible droplets, whereas droplets may easily be so minute and discrete as to be invisible and to escape recognition by sight or sensation. A sneeze in front of a mirror at a distance of several feet will demonstrate the varying size and the great number of projected droplets.

Transference of living bacteria in droplets directly from the mucous membrane of one person to the mucous membrane of eyes, nose or mouth of another, as accomplished by spray or droplet infection, is a very different proposition from the indirect mechanical transference, by hand or otherwise, of bacteria which may have ceased to be viable through exposure to conditions outside of the human body.

Under ordinary daily conditions of life there must be extensive overlapping of individual spray projection zones and even more intricate intersections of such zones will exist, of course, in crowded street cars and similar places. In fact it is difficult to imagine spending a working day or a shopping or recreation day in any city, or in crowded restaurants, theaters, trains and streets without being within the effective droplet range of other persons much of the time.

Any comprehensive discussion of the infection methods of respiratory diseases must, of course, include consideration of the well-recognized factors of dust irritation and dust-borne bacteria, which constitute an indirect method, by inhalation, of an entirely different kind—one not to be dismissed lightly. This method simply calls for mention, however, at this time, as an additional reason why the indirect contact infection of the kind urged by Cumming and others cannot play the all-important rôle claimed for it in the journal articles cited below.

EDITORIAL

OUR DUTY TO THE RESERVE

Since we have occupied the Editorial Chair of this magazine we have gone on record more than once in respect to this question and have tried to make it manifest that in our opinion there ought to be entire accord between the professional soldier and those who take up the question of service under arms, in addition to the other duties of citizenship, and from a proper feeling of patriotism and a desire to fulfil in its entirety the obligation which rests on every loyal man.

We wrote one or two editorials along these lines in the endeavor to prove that there is, fundamentally, little difference between the man who elects a military career as his life work and the one who desires to learn enough of it to be of service to the state in the event of a call to arms.

It is dodging the issue to refuse to recognize the fact that there has existed between these two classes, the professional soldier and the so-called "citizen soldier," more or less misunderstanding in times past. That is acknowledged, we believe, by both. Furthermore, there is no doubt that there have been grounds, on both sides, for this feeling of hostility. It must be admitted, however, by the partisans of either faction that this was something which was limited to individual and unfortunate instances, and that there could not be any rational basis for a misunderstanding which embraced either side as a whole. It is manifestly absurd to condemn any class for the shortcomings of certain individuals of the class. It is indisputable that the late war did much to break down these artificial class lines, which existed more as a matter of tradition than from any real basis on fact. When men have gone through battle shoulder to shoulder, have shared danger and hardship in a common cause, it must necessarily do away, to a very large extent, with any inherited dislikes which have had no real foundation except that they had long been supposed to exist. The war was the means of accomplishing an important thing in putting both classes on a better mutual footing; it taught each to know the other and it became quite evident that the "regular" was no more a disagreeable martinet than was the militiaman a jealous citizen who resented any attempt to help him in the knowledge of the art of war. It taught us to *know each other*, and, after all, that was about all which is necessary to lay the foundation of mutual friendship and liking.

We stated in one editorial that it would be difficult, if you took the clothes off a major general, a private, a regular and a militiaman, to tell one from the other. That what counted was that which was *in* the man, not *on* him, and that it would be good logic to rest our likes and dislikes on that ground rather than to make them dependent on what we wore.

We still think that is so and that if we begin, and end, with the hypothesis that we are all men and common citizens of our Republic, we shall find much in each other to like and lose sight of many of the petty jealousies which have rather confused our vision and warped our judgments in the past.

It is quite proper and desirable that we of the Regular Service should be the instructors, the big brothers, of our friends who do not make soldiering their entire business; and it is also well for us of the Regular Services to realize that, among those we teach, there are many keen and able minds and that oftentimes in our rôle of instructors we may have the benefit of ideas which may help us in the execution of our own duty. The editor saw service as "Inspector-Instructor" with the militia of two states, and his relations with those he inspected and instructed were so pleasant as to make the period of that duty enjoyable and profitable. This is, without doubt, the experience of most of those who have served in a similar capacity and is only a further proof of what we have said, that when we know each other we shall each find that the other is a good fellow and very worth while.

The object of our Association is to promulgate that feeling for the benefit of the state, since as good citizens that is the ultimate end for which we all work. That it has been attained in our society is beyond a doubt; our membership of regulars and reserves is testimony of it.

We of the Association have known this, of course.

To have it recognized by others and to be complimented on it cannot fail to be a source of pride and satisfaction to all of us who make up the membership of The Association of Military Surgeons. And so it is with a sense of much satisfaction that we publish the following letter from the Chief of Staff of the army which came to this office, unexpected and unsolicited, a few days ago.

We think that we voice the opinion of The Association in saying to the Chief of Staff that we shall still try, as we have in the past, to make our body one which may be thought well of by the Government, and one which may be seriously considered as an asset in preparation for the defense of the state in the time of her need.

JAMES ROBB CHURCH.

WAR DEPARTMENT
OFFICE OF THE CHIEF OF STAFF
WASHINGTON

MARCH 3, 1920.

From: The Chief of Staff.
To: Association of Military Surgeons.
(Through the Surgeon General of the Army.)
Subject: Officers' Reserve Corps.

1. During the process of demobilization, the strength of the newly built Officers' Reserve Corps has reached approximately 75,000 officers of all grades and arms.

These officers are a valuable asset to the military establishment and the stimulation of their interest in military matters, including such instruction as it is practicable to give them, is desired by the War Department.

2. Pending the enactment and carrying into effect of legislation for the reorganization of the Army, it is impracticable for the War Department to announce details relative to the organization and instruction of the Reserve Corps and the obligations, privileges and promotion of its members. In the meantime, it is suggested that reserve officers be given such information and instruction as is possible through the various service publications.

3. There are now in existence, or in the process of formation, associations of officers of various arms of the service. It is understood that reserve officers are eligible and welcome to membership in these Associations. The latter offer an existing and effective means of furthering close affiliation of regular and reserve officers and of furnishing instructive and informative matter to the Reserve.

4. Established service associations can probably provide for occasional semi-social local gatherings of regular and reserve officers, which gatherings will serve to bring about acquaintance and better understanding among all officers.

5. The Department has noted your efforts to encourage reserve officers to become members of the Association of Military Surgeons and trusts that such efforts will be continued and all reasonable steps taken by you to further the morale and instruction of reserve officers. The value of THE MILITARY SURGEON as a medium for the transmission of informative and instructive matter to reserve officers is fully appreciated. These efforts are approved by the War Department.

(Signed) P. C. MARCH,
General, Chief of Staff.

COLONEL LOUIS A. LA GARDE, U. S. ARMY

In one of the most charming of all the charming "Spectator" papers, Steele has drawn a word picture of the big-hearted man who *enjoys* doing those things which make his fellows love him. The theme is handled by the master essayist as an antithetic picture, by the limning of another type, who seeks personal plaudit and advantage, in the show of the spirit of kindliness.

Those who knew him best could easily read the picture of the altruist as expressing, in goodly measure, the character and impulsions of Col. Louis A. LaGarde, U. S. Army, who died recently. Certainly he carried the kindly heart and he gave forth very abundantly to those about him, and at all times, evidences marking the sweet spirit which goes with such a heart.

To be hospitable and generous, helpful and cordial was perfectly natural to him, and he assumed nothing and studied nothing in showing those qualities. At the same time, he carried with him a faculty of fully and correctly estimating worth, and its opposite, and no one who knew him could say that he let generosity overcome a certain sound judgment of men.

It was a rare treat to put your feet under a table with his feet. The good fellowship beamed from his kindly face and merry eye, and the scrutiny which he gave the solids and liquids put out for refreshment gave sauce to appetite second only to hunger.

The "Ballad of the Bouillabaise" was well known to him, but equally he knew how to concoct the mixture which inspired that gem of gastronomic lays. The menu at a good hotel gave him a theme for spirited comment and proper suggestion, which made one know that his refection was in the hands of a lover of his kind, and neither stint nor incongruity would find any place in the product of the little study, made for his benefit. Abstemious himself, he loved to provide for the friend at his side, and dull care never rode behind one who had the sunny presence of "Mr. President" to banish the unpleasant things in life and grace the passing hour.

This delightful realization of a jovial, kindly gentleman was coupled with a cultivated scientific habit of mind which made Colonel LaGarde a place in the foreground of the men whose professional work has added credit to the Army Medical Corps. For many years he held a clear-cut preëminence as an investigator and authority in gunshot surgery and the medico-military knowledge of fire-arms. He produced a great deal that is of lasting value, and his painstaking experimental work opened up new and abiding factors in the knowledge of gunshot infections. He gave the medical and military worlds much knowledge which was new to both, and in that achievement he earned and merited a broad fame, which will permanently adhere to his name and memory.

When Colonel LaGarde stood in the presence of the Master, he stood there like Colonel Newcome, a man—a gentleman—one who had done good work in this life, and whose heart was, yet, "as that of a little child."

F. A. Winter.

COMMENT AND CRITICISM

A METHOD OF PROPHYLAXIS IN RESPIRATORY INFECTIONS

In the February 21 number of the *Journal of the American Medical Association*, Corper and Enright, of Denver, write upon, "The Eye as a Portal of Entry of Infection in Respiratory Diseases," citing an interesting and suggestive series of experiments in which *B. prodigiosus* was used as an indicator or control. Their studies were directed primarily toward the working out of the avenues of tuberculous infection, but it is the belief of the writer that upon the general proposition of the respiratory diseases their ground is well taken and that the eye, in this connection, is worthy of the most careful consideration, alike in military and in civil practice. So convinced is he of this that both when commanding officer of Hospital Train No. 58 (A. E. F.), and later when surgeon of the 60th Artillery, C. A. C., this was the basis of a system of attempted prophylaxis, when respiratory disease appeared to be threatening in epidemic proportions.

In upper respiratory tract infections the lacrymal system appeared to be the quickest and the safest method of medication of the infected tract where large numbers had to be dealt with; and patients, both confined to bed and ambulant, received at two or three-hour intervals instillations of one drop of 20 per cent argyrol or its equivalent into each lower conjunctival sac. Contacts were similarly treated at three-hour intervals, and when in cantonments at Pontenezen, with a rising influenza and bronchitis curve in the surrounding community, what is believed to be a fairly low record, was secured for this regiment by the use of this method at the battalion and the regimental infirmaries.

This procedure was employed in hospital, in cantonments, in billets, on transports, and even in the field during offensive operations, and it is believed that it is worth much more than the trifling expenditure of time, effort and material involved in its application. It is equally applicable to individual cases and to groups of cases in civil practice.

While it is far from being the belief of the writer that this procedure yields 100 per cent results, it is his conviction that material results can be obtained in the diminution of infectious and communicable respiratory disease thereby.

EDWARD M. COLIE, JR.,
Lieutenant Colonel, M. R. C.

STATISTICAL RÉSUMÉ OF THE FRENCH MEDICAL SERVICE

In the "Revue Interalliée pour l'etude des questions interessant, Les Mutilés de la guerre," for September, 1919, an article appeared entitled "L'oeuvre du Service de Santé Française pendant la guerre." Name of the author not given. This is a statistical study based mostly on "Chiffres" or memo reports and accompanied by graphic charts showing the magnitude of the problems which the French Medical Department had to solve during the war. While these statistics are necessarily incomplete, it is interesting to note some of the figures.

France mobilized 8,410,000 men during the war. The total cost of the Medical Service was 2,416,647,598 francs or 61 fr. 20 per man per year. The evacuation of sick and wounded by the "Service de Santé" between August, 1914, and April, 1919, numbered 9,287,822. This apparently does not include those treated for slight illnesses or wounds and who returned promptly to their commands. Also it is seen that these evacuations exceeded the number of men mobilized by 877,822, and this without deducting number of killed in battle. The actual number of wounded who returned to the front after hospitalization must have been large.

The year 1915 shows the highest number of evacuations, 2,528,579 being disposed of. Included in these figures is the maximum number of wounded for any year during the war; 1,334,966 "blessés" having been evacuated. This may readily be accounted for when one remembers the aggressive drives of the Germans and the determined resistance of the French. The maximum sick were evacuated during 1918 when 1,318,026 were handled. This high figure for sick was due to the prevalence of influenza.

There were 390,362,542 days lost in hospital between August, 1914, and December, 1918. The minimum stay in each hospital was thirty-two days in 1914 and a maximum of fifty-seven days during 1916. The cost of hospitalization per day, per man was 3 fr. in the military hospitals and 6 fr. in the auxiliary hospitals. The military hospitals would seem to have been the more economical.

Tuberculosis and influenza were the two main diseases of the war and caused a great many deaths. There were 111,038 discharged from the Army between August, 1914, and December, 1918, on account of tuberculosis, and of these 25,600 were pensioned and 85,438 were discharged without pension. There were 12,220 deaths from this disease in the Army. Influenza took its toll during 1918–19. Between December 1 and April 30 there were 27,316 deaths. In December alone there were 23,202 deaths, 11,391 of these occurring in the Zone of the Army and 11,211 in the Zone of the Interior. This shows a higher rate for the Zone of the Army.

Development of Roentgenology in France received a great impetus during the war, and figures given for 1918 between January 1 and November 3 show how much they came to use this valuable adjunct. There were 958,166 X-ray examinations of 295,389 subjects. Of these 485,721 were radioscopic, 216,738 were radiographic, 162,576 localizations, and 93,121 were for the extraction of foreign bodies; 11,033 treatments were given.

During the war centers were established to which soldiers were sent for classification and disposition after the maximum amount of useful hospitalization had been reached. These boards decided whether a man was fit for further service or should be discharged, either permanently or temporarily. All medico-legal questions were also decided by these boards. Mainly they studied and recorded the amount of disability with a view to pension; 1,034,232 soldiers of all grades passed through these centers.

There were 92,325 severely wounded soldiers having amputations and other functional mutilations who were supplied and fitted with appliances.

No figures were given of the total number of casualties, nor the proportion of deaths from disease compared with deaths as battle casualties, nor what percentage of wounded were returned to the front after hospitalization. These figures, as well as the incidence of other diseases, especially those due to soil pollution, would ve very interesting and will no doubt be forthcoming in later reports.

Joseph F. Gallagher,
1st Lieut., M. C., U. S. V.

LAKE KEUKA MEDICAL AND SURGICAL ASSOCIATION

The Lake Keuka Medical and Surgical Association will hold its annual meeting, July 29 and 30, 1920, at Keuka College, Keuka Park, N. Y.

The scientific program, which is being arranged, will include short addresses on practical subjects which are of special interest to the physicians who live in the various counties represented.

This Association is peculiar in that it has no membership in the sense that most organizations have, but the meeting is open to all licensed practitioners of medicine. The controlling body consists of an executive committee appointed at the time of each annual meeting from among those in attendance from the various counties. There are no dues except a small fee for incidental expenses which is paid by those who attend.

ARMY CASUALTY LIST

The following figures represent the revision of the former published list which gave a total of 293,061 and 77,635 deaths.

The ratio of death from disease and death from battle causes is significant.

Killed in action	34,248	Prisoners unaccounted for	15
Died of wounds	13,700	Prisoners died	147
Died of disease	23,430	Prisoners repatriated	4,270
Died of accident	2,019	Total prisoners	3,432
Drowned	300	Wounded slightly	91,189
Suicide	272	Wounded severely	83,390
Murder or homicide	154	Wounded, degree undetermined	46,480
Executed by sentence of general court-martial	10	Total wounded	221,050
Other known causes	489	Missing in action	3
Causes undetermined	1,839		
Presumed dead	650	Grand total	302,012
Total dead	77,118		

J. R. C.

THE NATIONAL ANESTHESIA RESEARCH SOCIETY

At a meeting of the Board of Governors of the National Anesthesia Research Society held in Cleveland in March, it was voted to have the annual convention of the Society at Pittsburgh the week of October 4, this meeting to be in conjunction with that of the Inter-state Anesthetists' Association and the Pennsylvania Medical Society. It is possible that the Western Pennsylvania Dental Association also will join in the meeting.

BOOK REVIEWS

Injuries to the Head and Neck, by H. Lawson Whale, M.D., Camb.; F.R.C.S., Eng.; Captain R.A.M.C. (T.F.); formerly Captain, I.M.S. (Retired); The Queen's Hospital, Sidcup; No. 83 General Hospital; and Surgical Specialist to No. 53 General Hospital, B.E.F.; Surgeon for the Eye, Ear, Nose and Throat to the London Temperance Hospital and to the Hampstead General Hospital. Preface by Col. Frederick F. Burghard, C.B., M.D., M.S., F.R.C.S. New York: Paul B. Hoeber. Price, $5.00.

Dr. Whale's wide experience along these lines—beginning with the first battle of Ypres, where he handled many of those cataclysmic injuries to the face and neck which were the despair of the surgeons in those early days; later in the department of oral surgery at Boulogne where excellent results were early obtained; and finally at Queen's Hospital, Sidcup—make his study of the subject thorough and authoritative.

A widening horizon has been opened to specialists of the ear, nose and throat. The explorations of the rhinologist now extend to the pituitary fossa; those of the laryngologist, by endoscopy, to the bronchi and esophagus; while the aurist, being constantly confronted with ototic intracranial infections, is practiced in dealing with the middle and posterior fossae of the skull.

Since interest in facial surgery is certain to outlive the war which aroused it, the chapters dealing with this subject will be found especially valuable. In the sections on facial and nasal surgery, an attempt has been made to assist medical men in industrial districts and other communities where machinery accidents occur by suggesting to them not only what to do at once, but also what to leave until later. The handling of gunshot injuries of the face and jaw, as outlined in this volume, forms a stirring and profound chapter on the new technique of present-day surgery as developed by the necessities of the war.

Francis M. Munson.

Education in Peace and War, by Stewart Patron, M.D., Lecturer in Neurobiology, Princeton University; Lecturer in Psychiatry, Columbia University; President, Eugenics Research Association. New York: Paul B. Hoeber, 1920. Price, $1.50.

During the war the public developed keen interest in cases of so-called "shell-shock," and the methods developed for its prevention. The author shows that peace, no less than war, produces "shell-shock." Those who are nervously unfit fill the almshouses, reformatories, courts, hospitals and sanitariums, and the author shows the necessity of training investigators competent to undertake the solution of these problems.

Francis M. Munson.

Social Work—Essays on the Meeting-Ground of Doctor and Social Worker, by Richard C. Cabot, M.D., Boston and New York: Houghton Mifflin Co.; Cambridge: The Riverside Press, 1919. Price, $1.50.

Doctor Cabot has placed at our disposal an illuminating set of essays on social medicine which will prove useful to physician and social worker alike. The author used some of the same material in his lectures given at the Sorbonne early in 1918 which were later published by Cres & Cie under the title of "Essais de Medicine Sociale."

In the introduction the historical development of social assistance in medical work is traced in an interesting manner. Part I is entitled "Medical-Social Diagnosis" and treats of such subjects as the medical standing, duties, and equipment of the social assistant; economic investigation by the social assistant; mental investigation by the social assistant; the social worker's investigation of fatigue, rest, and industrial disease. In Part II, under the heading, "Social Treatment," samples of social treatment are given and the motive of social work is explained.

FRANCIS M. MUNSON.

MANUAL OF TROPICAL MEDICINE, by Aldo Castellani, C.M.G., M.D., M.R.C.P., Lecturer at London School of Tropical Medicine; Emeritus Professor, Ceylon Medical School; Lieut. Colonel, Royal Italian Naval Medical Service, 1916–1918, Balkan Zone; etc., etc., and Albert J. Chalmers, M.D., F.R.C.S., D.P.H., Director, Wellcome Tropical Research Laboratories (Soudan Government); Ceylon Medical Service, 1901–1911, etc., etc. Third Edition. London, 8 Henrietta Street, Covent Garden: Bailliere, Tindall and Cox, 1919.

This valuable work needs no introduction to those of the medical profession interested in tropical medicine and hygiene. The preparation of this, the third edition, was delayed by the war but advantage has been taken of the opportunity to rewrite large portions of the book, to introduce many new subjects, and to greatly increase the number of illustrations. It now contains over twenty-two hundred pages of text, but its retention in the form of one volume is considered advisable by the authors as their experience in the tropics has led them to believe that this is the most convenient form for the tropical practitioner and student.

FRANCIS M. MUNSON.

SHELL-SHOCK AND NEUROPSYCHIATRY, by E. E. Southard, with a bibliography by Norman Fenton. Monography Number Three of the Psychopathic Department of the Boston State Hospital. Boston: W. M. Leonard. Publisher.

This is a compilation of 589 cases of war psychoses, neuroses, and commotions, some of which proved to be epileptics, alcoholics, asthenics, hebephrenics, cyclothymics, sub-normals, and troponematoses, all of which are persistently termed by laymen "shell-shock." A critique of the data follows in which the attitude of the state towards the syphilitic further damaged by war is discussed in favor of the man, a conclusion which does not harmonize with that of French psychiatrists. Epilepsy is then similarly discussed. Cases to illustrate the somatic factor in shock receive detailed presentation also. Following is a discussion of the functional neuroses; and here the opinion is expressed that the positive conception of Babinski is confirmed by the data of the war. The lack of relation of war neuroses to insanity is brought forth. The dynamopathic concept of these disorders is emphasized, and diagnostic tables from Babinski are included. There is then a discussion of the pathology of commotion, and finally the treatment of the neuroses is reviewed.

Greater definiteness in epicrisis would have been reached, the reviewer believes, had the editor studied cases in France and had he discussed the later work of the French and English neurologists with them. The book, which is prefaced by an introduction by Charles K. Mills, concludes with a very extensive bibliography, although, of course, many more valuable articles have been published subsequent to the issue.

TOM A. WILLIAMS.

MANUAL ON FOOT CARE AND SHOE FITTING: For Officers of the United States Navy and United States Marine Corps, by W. L. Mann, Ph.B., A.M., M.D., Lieutenant Commander (M. C.), U. S. Navy, Post Surgeon, Marine Barracks, Quantico, Va.; and S. A. Folsom, M.D., Lieutenant (M. C.), U. S. Navy; Medical Officer in Charge of Orthopedic Division, Medical Department, Marine Barracks, Quantico, Va. With 58 Illustrations. Philadelphia: P. Blakiston's Son & Co. Price, $1.75 net.

A knowledge of the contents of this little manual will relieve the mind and increase the efficiency of the command of many a hard-worked officer, line and staff. It gives him precisely what is necessary for the proper care of the feet of his men and will serve as a guide and source of reference for all officers whose duties involve the supervision of enlisted men and responsibility for their welfare. The book is well written in language not too technical, and bids fair to create an interest in this important subject.

The subject-matter is divided for discussion into a number of sections under such headings as "Responsibility for Proper Fitting of Shoes," "The March," 'Developing the Feet of the Recruit," "Care of the Shoes," "Military Foot Inspecttion," and a number of sections devoted to the consideration of orthopedic affections of the feet.

The illustrations are excellent and are nearly all original.

FRANCIS M. MUNSON.

POPE'S MANUAL OF NURSING PROCEDURE, by Amy E. Pope, formerly Instructor in the School of Nursing, Presbyterian Hospital, New York; Author of "A Medical Dictionary for Nurses," "A Quiz Book of Nursing," "A Dietary Computer," etc. New York and London: The Knickerbocker Press, 1919. Price, $2.40.

Miss Pope's latest text-book on nursing has been prepared more especially to facilitate teaching, by demonstration, as much of the practical work of nursing as is usually included in the junior year instruction. In addition to the descriptions of demonstrations, directions are given for treatments which cannot generally be shown in class and precautions are mentioned which, though essential in the care of patients, cannot be carried out in class. In compiling the work great care has been given to details and the reason for each separate procedure is made clear to the young nurse; practice is correlated with theory. The course, of which this is intended to be the text-book, is assumed to be given in the form of ninety carefully graded demonstrations, beginning with the care of the ward and its furnishings and ending with Carrel-Daking treatment of wounds. A desirable feature is a carefully prepared list of the equipment needed for each nursing procedure. The type is clear, the binding and paper substantial and the illustrations sufficient.

FRANCIS M. MUNSON.

RAMBLING RECOLLECTIONS—An Autobiography, by A. D. Rockwell, M.D. New York: Paul B. Hoeber, 1920. Price $4.

Dr. Rockwell tells the story of his life in a very human way, and his book can hardly fail to interest all readers, whether friends of the author or not. During his career as a surgeon in the Federal Army during the Civil War, and later as a neurologist in New York, he saw many interesting historical events and met and associated with many of the most prominent men of his time. The description of the first electro-executions, with which Dr. Rockwell was associated in an advisory capacity, and the reminiscences of such characters as Edwin M. Stanton, President Hayes,

Henry Ward Beecher, Commodore Vanderbilt and Mark Twain are well worth reading.

Printed in easily read type on good paper, and handsomely bound in extra cloth, this book will make a pleasing addition to the doctor's "bedside library."

FRANCIS M. MUNSON.

HELPING THE HELPLESS—in Lower New York, by Lucy Seaman Bainbridge, Honorary Superintendent, Woman's Branch, New York City Mission Society; author of "Round the World Letters." Introduction by Rev. A. F. Schauffler, D.D. New York and London: Fleming H. Revell Co.

The long experience of Mrs. Bainbridge in welfare work has given her a very clear understanding of both the practical and spiritual phases of applied sociology. In this interesting book she relates a series of selected incidents showing the nature of her work and the splendid results attained. A study of the methods found so successful in solving the many complicated problems arising among our newly arrived foreign population will be of material assistance to those whose duties take them to such fields of endeavor as lower New York. The stories are told in a pleasing manner and the typography and binding of the book are excellent.

FRANCIS M. MUNSON.

PHYSICAL RECONSTRUCTION AND ORTHOPEDICS, by Harry Eaton Stewart, M.D., Lieutenant, Medical Corps, United States Army, Division of Orthopedics; Assistant Instructor, Section of Physiotherapy, Surgeon General's Office; Instructor in Medical and Orthopedic Gymnastics and Massage, New Haven Normal School of Gymnastics; Attending Surgeon, New Haven Orthopedic Dispensary; formerly Instructor in Corrective Gymnastics, Teachers College, Columbia University. Authorized for publication by the Surgeon General, United States Army, New York: Paul B. Hoeber. Sixty-four original illustrations. Cloth, 8vo. Price, $3.75.

In this timely manual the author has presented in condensed form the main principles of orthopedics in the treatment of the defects of childhood, war injuries, and industrial accidents, laying stress upon the treatment by massage, exercise, and other types of physiotherapy. He gives the directions for the various types of treatment as well as the theoretical considerations. This will be of great assistance to reconstruction aides in physiotherapy, workers in vocational reconstruction, physical directors, and orthopedic surgeons. The illustrations are excellent and the typographical work leaves nothing to be desired.

FRANCIS M. MUNSON.

BOOKS RECEIVED

Books received are acknowledged in this department and such acknowledgment must be regarded as a sufficient return for the courtesy of the sender. Selections will be made for review in the interest of our readers and as space permits.

POPE'S MANUAL OF NURSING PROCEDURE, by Amy Elizabeth Pope. New York: G. P. Putman's Sons. Price, $2.40.

FOOT CARE AND SHOE FITTING, by W. L. Mann, Lieutenant Commander, U. S. Navy, and S. A. Folsom, Lieutenant, M.C., U.S.N. Philadelphia: P. Blakiston's Son & Co. Price, $1.75 net.

SURGICAL SHOCK AND THE SHOCKLESS OPERATION THROUGH ANOCI-ASSOCIATION, by George W. Crile and William E. Lower. Philadelphia and London: W. B. Saunders Company, 1920. Cloth, $5.00 net.

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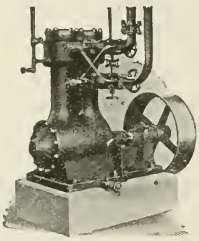

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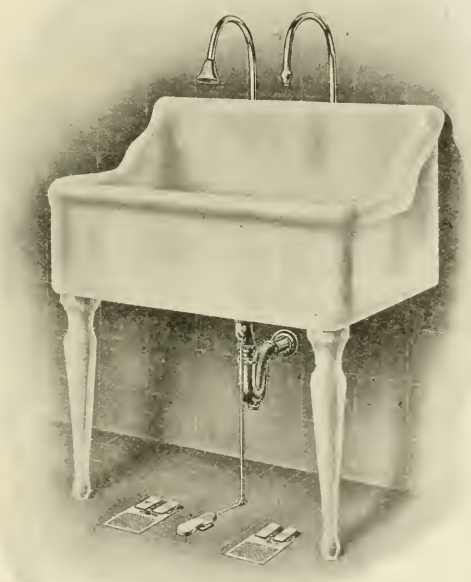

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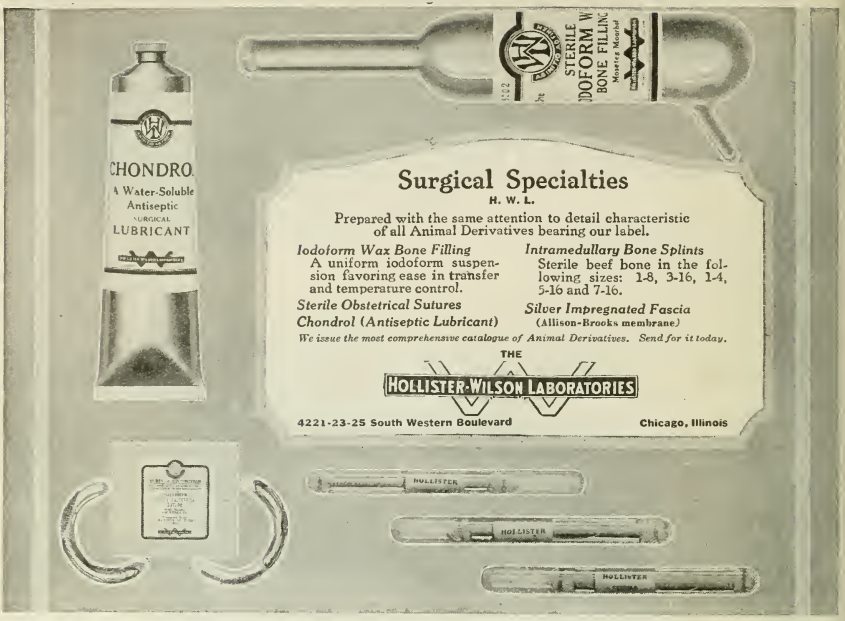

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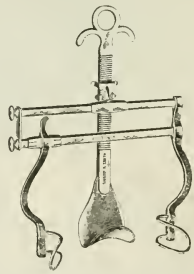

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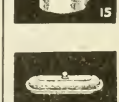
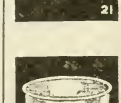
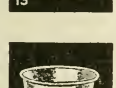
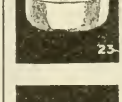
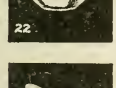
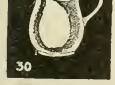
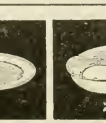
Fig. 3—Seamless Pitchers, sizes 1½, 1¾, 2½, 3½ and 6 quarts.
Fig. 4—Pitcher, capacity 2 quarts.
Fig. 5—Dressing Jars, sizes ½, 1, 2, 3¾ and 4 quarts.
Fig. 6—Irrigators, sizes 1, 2 and 3 quarts.
Fig. 7—Irrigators, sizes 1, 2 and 3 quarts.
Fig. 8—Funnels, diameter top, 3⅛, 4¾ and 6¼ inches.
Fig. 9—Oval Seamless Tubs, sizes 11 and 16 quarts—17 and 19 in. long.
Fig. 10—Conical Mugs, sizes top, dia. 2¾, 3⅛ and 3½ in.
Fig. 11—Conical Tumblers, sizes top, dia. 2¾, 3⅛ and 3½ in.
Fig. 12—Dinner Plates, sizes dia. 7⅛, 7⅞, 8¾, 9¼ and 10½ in.
Fig. 13—Soap Dish with Drainer, size 5¾ x 4⅛ x 1⅛ in.
Fig. 14—Cups and Saucers, sizes, cups ½ and ¾ pints; saucers 6⅛ in. dia.
Fig. 15—Sputum Cup, size 3¼ x 3¾ in.
Fig. 16—Oval Trays, sizes 10 x 8 x ¾ in., 12 x 9½ x 18/16 in., 14 x 11¼ x ⅞ in., 16 x 13 x 16/16 in., 18 x 14 x 1 in., and 20 x 15 x 1⅛ in.
Fig. 17—Round Medicine Trays, sizes dia. 8, 10 and 12 in.
Fig. 18—Oblong Serving Trays, sizes 8⅜ x 11¼ and 11¼ x 16¼ in.
Fig. 19—Pus Pans, Kidney Shape, sizes 6¾ x 3 x 1¼, 8 x 3½ x 1½, 10 x 5 x 1¾ and 12 x 7 x 2 in.
Fig. 20—Basins, size 10⅜ x 2¾, 11¼ x 2¾, 11⅞ x 3½, 12½ x 3⅜, 13¾ x 3⅞, 15 x 4, 15⅜ x 4½, 17¾ x 4½ and 19¾ x 5 in.
Fig. 21—Brush or Instrument Tray, size 8 x 3 x 1½ in.
Fig. 22—Eating Bowls, sizes 4 x 2¾, 4¾ x 2¾, 5½ x 3 and 6¼ x 3¼ in.
Fig. 23—Sponge Bowls, sizes dia. by depth: 4 x 2, 5 x 2¼, 6 x 2¾ in.
Fig. 24—Bed Pan, 18½ in. long by 4 in. deep.
Fig. 25—Queen Bed Pan, 15 in. long over all, 12 in. wide over all, 4 in. deep over all.
Fig. 26—Instrument Trays, sizes 7⅛ x 5⅝ x 1¼, 8 x 6 x 1¼, 9½ x 7½ x 1⅜, 16⅜ x 10¾ x 2⅜ in.
Fig. 27—Solution and Immersion Bowls, sizes 7 x 3, 8¾ x 3¼, 10¼ x 3¾, 11¾ x 4½, 12½ x 4½, 13½ x 4¾, 14¼ x 5, 15¾ x 5¾ and 17¾ x 6½ in.
Fig. 28—Ceylon Tea Pots, Individual, sizes 1½, 2 and 3 pints.
Fig. 29—Cuspidor, 7 in. dia. by 4 in. high.
Fig. 30—Cream Pitchers, capacity ½ pint.
Fig. 31—Male Urinal, seamed, capacity 1 quart.
Fig. 32—Female Urinal, seamed, capacity 1 quart.
Fig. 33—Bed or Douche Pans, Seamless, size 15¾ x 11¾ x 3 in.







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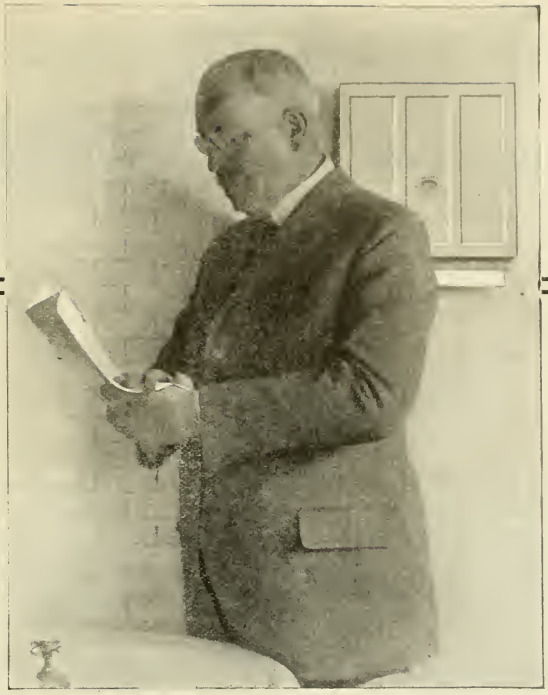

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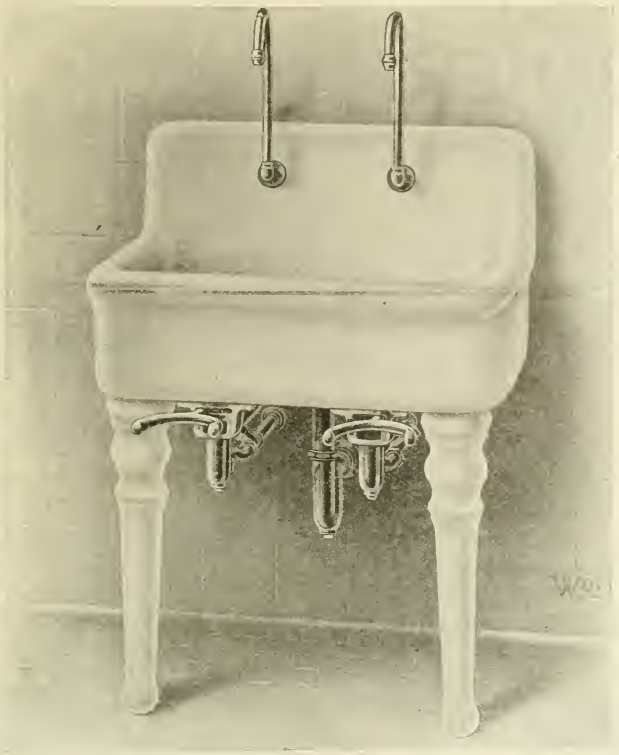

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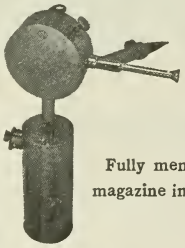

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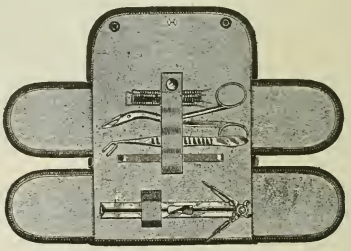

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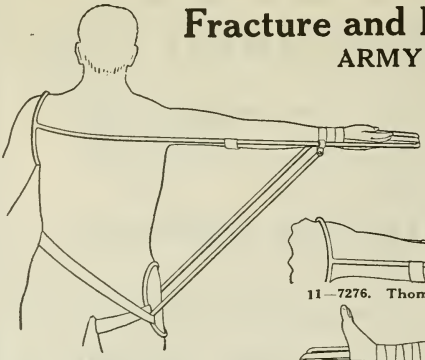

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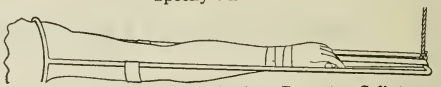
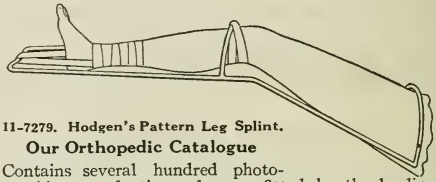


11—7276. Thomas' Straight Arm Extension Splint.



11-7279. Hodgen's Pattern Leg Splint.

11-7275. The feature of this splint is the adjustable bracket which can be regulated to incline or decline the arm extended with adjustable hip bracket.

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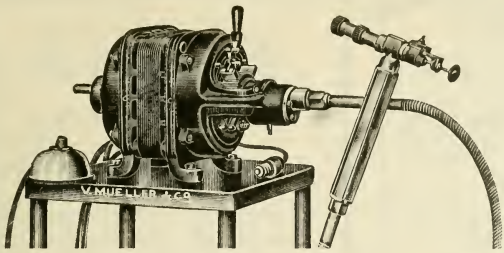

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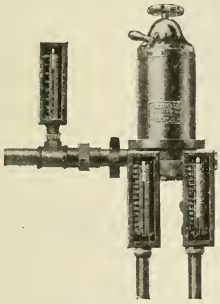

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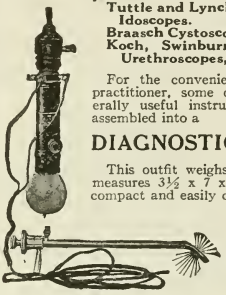

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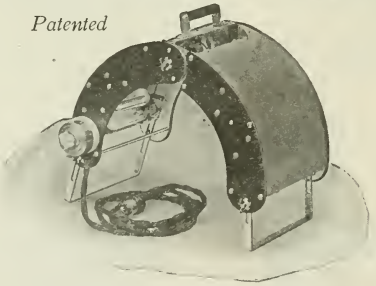

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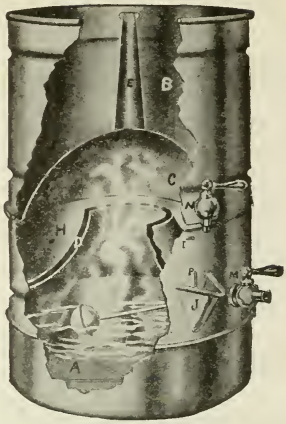

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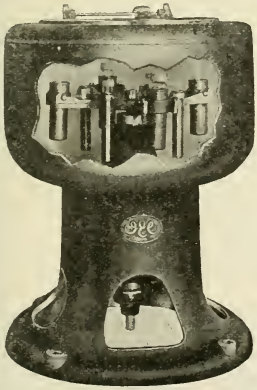

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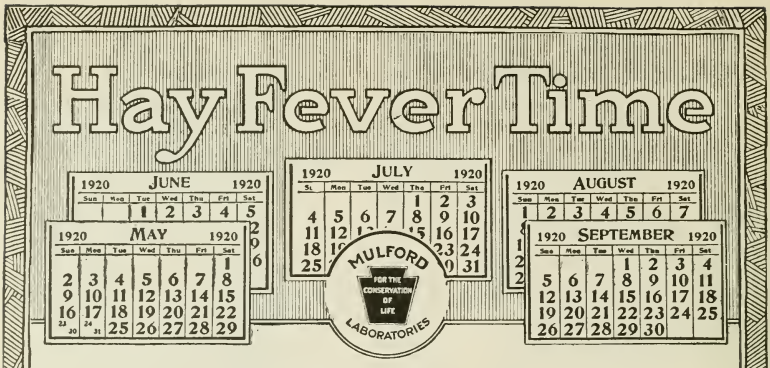

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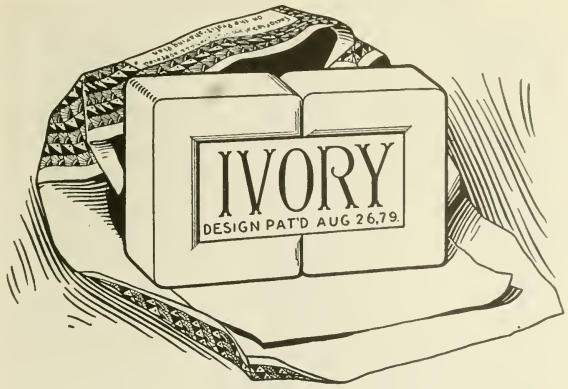

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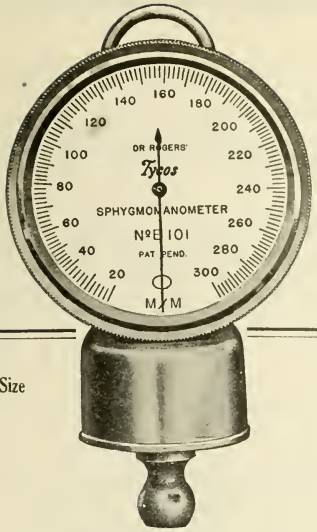

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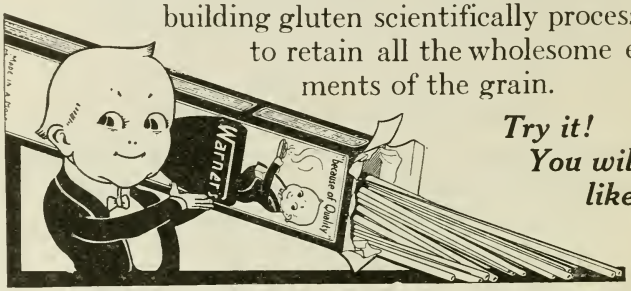

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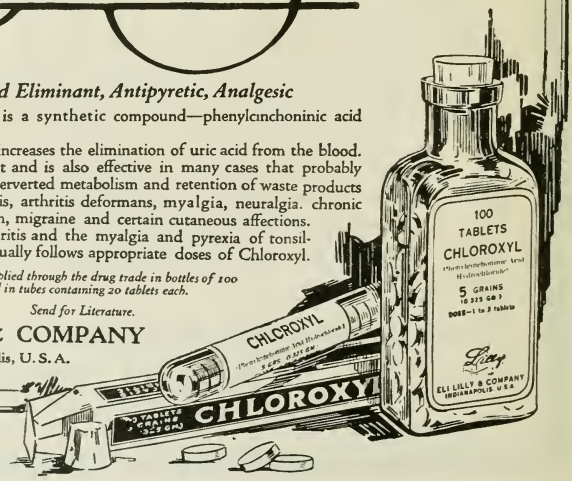

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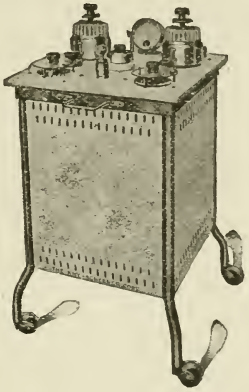

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